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JAN. 4, 1954

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 Monday, JAN 3 and 4, 1994[illegible]

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17. **CPT. JAMES E. VERNON** flew the Navy's F4D Skyray to a world speed record of 783.4 mph on October 3, 1955. The Skyray, designed and built by Douglas Aircraft Company, used a Westinghouse J40 jet engine also manufactured by Douglas.

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NEWS DIGEST



Conyair Launches First Production Tradewind

Turboprop-powered Conquest RSE-1 Toweded Sling boat in the water following launching from company's ramp on the edge of San Diego Bay (Skiffline Week Dec. 28, p. 32). It is the first of a number of Toweded Sling boats produced for the Navy. The 40-ton Allcon-constructed bright and stainless-steel boat has a two-speed

more than 350 mph. It is derived from the XP594 prototype and features numerous improvements over the earlier type, including more streamlined, shorter engine nacelles and new bracing arrangement for wingtip floats, which finally used cantilever suspension. Naves will operate in Tunderland Reef out of Alameda, Calif.

Domestic

Frank J. Macklin, director of the military bureau of Air Traffic Conference of Aeronautics since its inception, is now assistant vice president-traffic of Air Transport Assoc. Macklin retains his previous duties in addition to further Air Traffic Conference responsibilities.

won Midwestern Travel Writers Assn.'s award for "best travel promotion in the world for 1958."

Business executives will be offered discounted or limited seating on a contract basis, according to plans of so-called open-seated Bellini (N.Y.) Air Transport.

aircraft, two each going to Transportes Aereos Internacionales, Compagnie Generale Transport Aereos Air Algiers and Agis Azur. Deliveries will start in the summer of 1985. TAI already has two DC-6Bs.

Aviation C-46 crashed last month as it approached Guamachu City on a cargo flight from Brownsville, Tex., killing the pilot and co-pilot. The crash was the first fatal accident for the government-owned Guatemalan airline in more than 15 years of operation.

Aircraft assembly plant will be constructed by Mexico this year. The factory is among several projects planned by the government to encourage civil aviation.

Blasting Air Transport has changed its name to Blasting-Cheer Air Transport, bringing into effect a partnership between the independent British airline and Cheer Line airlines.

New Arabian Airlines is taking preliminary steps at Vienna through efforts of the Viennese Airport Operating Co., Ltd., founded to pave the way for Arabian's first regular civil air carrier.

Japan's Kawasaki Gifu Works (previously Kawasaki Aircraft Co.) is negotiating with Lockheed for a license to repair and refurbish jet planes.

Two Bell 430 helicopters are scheduled to go into service with Royal Norwegian Air Force early next year, increasing the country's fleet of U.S.-built rotors to eight.

Howard Hughes has filed reciprocal trust papers in Delaware for Hughes Aircraft Co. At midweek, company officials had not commented on the move.

W. A. Patterson, president of United Air Lines, has accepted Pirelli's YH-16 transporter 40-passenger USAF helicopter prototype now being tested at Philadelphia International Airport.

Six U.S. air carriers—Allegiant, Flying Tiger Line, Seaboard & West Air, Audiotex, Overnite National Airways, Transcon Air Lines and California Eastern Airways—have joined the International Federation of Independent Air Transport Operators. New members operate a total of 91 transporters, increasing the IATO fleet to 770.

Financial

North American Aviation, Los Angeles, had net earnings of \$12,773,368 during fiscal 1955, an increase of 94,952,475 over 1952. Sales totaled \$656,537,658, more than double the previous year's \$317,398,032. Working in 1955, 10-1958 million. NAA does not expect the eight-week wage strike called by United Auto Workers (UAW) (Automotive News Dec. 21, p. 18) to reduce materially fiscal 1956 sales and earnings.

International

Grumman SIF two-engine anti-submarine planes (picture, p. 15) will be built under license by de Havilland Aircraft of Canada at Toronto for the Royal Canadian Navy. Delivery of the planes is expected to begin early in 1946. They will replace the World War II Grumman SIF Avengers now used by RCN.

Four-year scholarships in the Lockwood Leadership Fund will be awarded in 1994 to 20 students.

Pan American World Airways Inc.

Six Douglas DC-6Bs have been purchased by three independent French

Jato Release on Republic's F-84 AIRBORNE Actuated



The J-424 actuator (left) and J-425 (right) are shown in their retracted and actuated positions.

This conveyer of Airborne's Model R-450 actuator shows the currently adjustable positive stops which, in conjunction with torque-limiting members, provide accurate positioning at both extremes of travel. The force may be set any value to 375°.

Positioning of the optional output shaft, on both sides of the actuator, helps adjust the model R-450 to any application. The weight of this unit, with valve noise filter is 37 pounds—the speed, at 25 rpm and 250 pound inch load is 1 rpm.

See our insert in the L.A.S. Aero-Naval Engineering Catalog for details on this and other Airborne actuators.

AIRBORNE
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The Aviation Week January 4, 1954

Headline News

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may be a hackneyed phrase, but it is literally true at RFP. Everything is made to exact specifications and meticulously tested to meet our standards. RFP is the only manufacturer of aircraft components who can guarantee the quality of its products.



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PRESENT AND FUTURE—North American F-84C Sales of 10,000 aircraft are expected for the F-84C, which is being produced at a rate of 1,000 per month. The F-84C is a single-engine, single-seat, single-engine fighter aircraft, with a maximum speed of 1,000 mph.

New Military Jets Try Their Wings Here and Abroad



FRENCH ATOM BOMBERS—Chained by its wings, the Atom is capable of carrying an atomic weapon. The Atom is a single-engine, single-seat, single-engine fighter aircraft, with a maximum speed of 1,000 mph.

FRENCH DELTA FIGHTER—Built on being constructed on new lightweight aluminum F-84C fighter (above and below), powered by our 100-hp-thrust Turbopropeller Delta (see Aviation Week Aug. 3, p. 79). It is designed for a top speed of 250 mph.



DELTA CLOSEUP—Crew is positioned over the small cockpit of the F-84C delta fighter. The plane spans approximately 47 ft. and is about 9 ft. long. Flight direction is estimated at 50 mph. Wing has 19.5% sweep, and aspect ratio is 2.7.

Remington Rand Methods News

Manufacturer Increases Typing Production 75% With Remington Electric Typewriters

This startling figure came right out of an efficiency report made by J. F. Wilson, Purchasing Agent at Northrup Aircraft, in his new words: "With the new Remington, we now have an 85% more production output. There are 85% more words and 24% more information put on each production order. We have shorter output with less chance for error." This really illustrates how Remington Electric is handling the load of paperwork with less cost and SAC when sales jumped from half a million dollars to six million dollars.

Increased typing production followed immediately after Remington Electric was installed because typing is so much easier. Efficiency does the work and controls the keyboard, shifts and carriage return. Typists have no more and better work immediately.

United Airlines, Denver Airfield and Globe L. Martin, was just a few of the many other organizations which have discovered the economy of electric typing. Learn how you can obtain these benefits. Get 50-page book, "Benefits of Electric Typing" REM11B.

Timken Roller Bearing Effects Big Savings Using Karda-Film For Personnel Records



Let this Certified Report written by an Analyst of the Timken Company show you why personnel records need to be kept meticulously. Use an ordinary 35mm driver which formerly had 1,000 to 4,000 holes per month, now holds 100,000 documents!

Further, how Karda-Film records find under the Timken system month for each year of filing and reference that Timken now actually issues a "hard" personnel record as easily and quickly as one on the active film!

Read New York Times Staff Editor's note on conventional rolls only to find how microfilm offers for a personnel records file. Karda-Film holds millions of records on each roll grouped by a particular subject rather than isolated as a mixture of different individual records. Documents no longer need to be kept up-to-date. Karda-Film Reader shows the records actual size right from the card and makes accurate reproductions.

Your personnel records are important to your company, your employees and others in your plant. Some of the best of Timken's experience. Get CEM6.

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New Booklet on Preventive Maintenance Gives Flow Chart for Effective Control



Punched Cards Can Help Medium-Sized Plants, Too!

Are more than 5 out of every 100 of your production workers doing plant maintenance? That's what a recent survey of manufacturing plants in the U.S. established! It is now easier than the latest developments in Preventive Maintenance Records, displayed at the Plant Maintenance Show held in Chicago in January, attracted attention.

"If you need that outfit, send to-day for our new form booklet X1383, which is now in stock. It's a great maintenance control system which is now easy to use in both in your plant

how it knows maximum equipment productivity at greatly reduced operating cost.

These methods virtually indicate what operations are needed... permit adjustment of work ahead of time... plan the best possible maintenance schedule. Simplified methods provide light control with paperwork streamlined to an absolute minimum.

The requirements of any such system are the same regardless of the size of the work force. They should include all of the following: 1) Written Work Order 2) Scheduled Work 3) Equipment Records 4) Service Control 5) Records Reports.

Actually, maintenance management simply can't be a haphazard, piecemeal job without a planned system with effective records providing all the facts for making sound decisions. The system outlined in this booklet virtually does for these facts at a glance!

Get this new booklet today. But thousands and descriptions of how records which will know plants are actually using it to get their maintenance operations on the same efficient basis as other operating departments. Ask for X1383

One-way-most test manufacturers, with 775 employees, ordered 400 production-control, cost records, payroll, inventory control, sales analysis and special reports in one 4-day department with punch-card procedures.

In sales analysis alone punched cards gave them a report that previously took 25 days, to the accuracy short time of 2 days! In the words of their chief accountant: "...We would have been difficult to operate with anything like our present efficiency, without these economical and efficient punched cards." See Certified Report REM11B.

WHO'S WHERE

In the Front Office

Robert H. Charles is now executive vice president of McDonnell Aircraft Corp., St. Louis.

D. W. McKeown has been elected vice president in charge of engineering and maintenance for Northrup Aircraft.

L. L. Gaher is a director, vice president and general manager of H. K. Porter Co.'s newly acquired Corbin, May-Mott-War Co. in Forest Park, Ga.

Gen Robert J. Smith, president of Federal Air Lines, has been appointed a member and deputy chairman of the board of the 11th District of the Federal Reserve Bank.

William H. Moore, vice president of Eastern Trust Co., has been elected to the board of Republic American Corp., Farmington, Conn.

Thomas S. Nichols, president of Nicholson Chemical Corp., John C. Lippert, executive vice president of Matheson, and Raymond H. Adams, of Adams, Forrest & McLean, are new directors of Eastman Motor Inc., Rochester, N. J. (Aviation Week Nov. 2, p. 7).

Changes

Sheldon J. Carver has been appointed chief adviser of Civil Aeronautics Administration's international field office at Tokyo. Forrest B. Morgan is CAA's new chief adviser in Peru.

F. W. Miller, formerly with Flying Tiger Line, has become chief engineer of Thermo Fuel Engineering Co., San Francisco, Calif.

William H. Beattie, executive agency liaison line manager for South America, has been named general sales manager for Rotol Aircraft.

Ray Chevrolet is now technical director of McMillan Laboratory's Manufacturing Division at Torrance, Calif., where he is in charge of all development of aircraft production technology.

Honors and Elections

Richard Palmer, secretary to the president of Fairchild Engine & Airplane Corp., has been elected chairman for 1954 of the Washington representatives group of the National Security Industrial Area. He has been elected to the executive committee of NSIA.

Frank M. Park, chief engineer of General Electric Electric Division, has been elected national vice president for aircraft division of the Society of Automotive Engineers.

David W. McKeown, manager of both personnel and education for General Electric's Northrup Division, is a new fellow of the American Institute of Electrical Engineers.

George F. Chaplin, vice president of Fairchild Engine & Airplane Corp., and Roger M. Kahn, executive member and host for General Electric's Engineering Corp., have been appointed to the board of trustees of Adelphi College, Garden City, N. Y.

INDUSTRY OBSERVER

Substantial number of RB-57D reconnaissance bombers will be modified by Convair's Ft. Worth Division for use as flying aircraft carriers in USAF's FICON system (Aviation Week Aug. 31, 1953, p. 12). Planes will carry a Republic F-84F as the bomb-bay for delivery of tactical weapons by unpowered fighters over ranges up to 5,000 mi.

One indication of positive attitude toward such use is that in Nike (Aviation Week Dec. 28, p. 18), in that loading racks must follow each missile item launch to support. The racks number of targets loaded at one time to the number of racks available in the battery area. Active loading with tracking systems on each missile permits multiple or successive launches, limited only by battery logistics.

USAF's Directorate of Flight Safety Research attributes several recent jet accidents to miscalculations of density altitude for takeoff; ambient temperatures instead of runway temperatures were used for computing takeoff distance. Importance: jet bomber landed at 5,000 ft altitude in 11,000 ft at 59 F conditions but miscalculated to 15,118 ft, at temperature was over 100 F. Takeoff distance emphasizes importance of data in USAF jet bomber operations.

Watch for first series use of transition in new magnetic monopoles developed by Bendley Co. Ltd., San Francisco. Magnetic monopoles break down transition phenomena—required to improve intelligibility and reduce noise, compared with current coil systems. More than 1,000 lb of noise testing has been completed, and one major carrier is reported ready to place a standard order.

Helicopter engine power loadings could be reduced as much as 25% by the use of gas turbines in short-lead design, says R. F. Knowlton of Sikorsky Aircraft. Although the gas turbine offers the ultimate solution, he predicts that live in 10 years of profitable service as engines will be accumulated by substituting engines before they are made obsolete by the gas turbine.

Total of USAF jet fighter losses is now nearing the 50,000 mark. In 1949, only 90,000 ft, had been reached up by the Air Force. Only one-fourth of current USAF flight loss is in jet.

Wreckage of crashed Texas ADM AC-119 aircraft monoplane destroyed by Fred Wick has been taken over by Transalco, Inc., El Segundo, Calif., and is being used, possibly with a more powerful engine. AC-119 crashed near Los Angeles, Calif., in 1951, but the pilot walked away without (Aviation Week Aug. 24, 1953, p. 12).

Conversions with vertical-lift capacity of the helicopter and capable of high speed speeds will be developed within the next 20 years, predicts Frank N. Flanck, head chairman of Pleski Helicopter Corp.

North American Aviation is designing a Hamilton wheel-and-rod for subsonic, transonic and supersonic flow in its ball alignment to its Los Angeles plant.

Aeronautical Radio is making another try to get FCC approval for a nationwide network of radio VHF stations to be owned and maintained by American Telephone & Telegraph Co. AT&T has worked out new plan that would give AT&T personnel access to VHF equipment on AT&T property, hoping to counter one basic objection that FCC raised to original plan (Aviation Week Oct. 18, 1953, p. 10).

Bullfinch Division of Twin Cee Co. is looking for production of center main and wing for the Navy Grumman S2F sub-battle and parts for the USAF F-105.

Daugherty Aircraft Co. has delayed altitude record attempts by its XP4D-1 Navy prototype with the Navy's fighter's Westinghouse J40 turbojet, which has been returned to the engine producer.

ACC Production Policy Review

The President's air policy study by Air Coordinating Committee (Aviation Week, p. 17) will include a "review of policies affecting the aircraft manufacturing industry." ACC, under chairmanship of Casanova Undersecretary Robert Manno, added this item to the Presidential policy review agenda at its most recent meeting in response to heavy protest from members of Aircraft Industries Assn.

Membership of the new ACC subcommittee for this manufacturing policy review had not been named last week. It will include military and civil organizations, who will submit recommendations to the President on:

- Aircraft production volume in peacetime profit and volume level
- Profit margins, generally near 25%, vs. prevailing U. S. manufacturing levels above 15%
- Decertified tax exemption and other promotional devices

Deadline for the body of the ACC report to the President is Apr. 1.

New Session: Wait and See

The new session of Congress probably will take a few weeks before tackling aviation issues, awaiting the President's message.

• State of the Union message by the President Jan. 7, giving highlights of the Administration's program on aviation, is not expected to say anything new on defense.

• The President's economic message, due the following week, is expected to spell out the Administration's plan to meet a recession with open to business and public works, such as airport development. Commerce Department's Business and Defense Services Administration, which has industry demands on tariff and clearance, is now working several months on ways to meet similar economic growth.

• The President's foreign message, not likely to go to Congress much before the Jan. 21 deadline, probably will be the first disclosure of details on the Administration's specific civil and defense aviation program. After that, congressmen will be ready to go into action.

Security on Speed

USAF has clamped a security restriction on the release of information on any future speed record attempts or speech uttered by new aircraft.

The order by Air Force Secretary Harold Tamm follows the suggestion of Trevor Gardner, special assistant for research and development, to limit such information from the public on the grounds it endangers the national defense.

Tamm's order will not affect a transatlantic speed run scheduled soon by Col. William W. Millikan in an F-86. Shapiro says the ban will hold up until the Navy comes up with another speed and announces the results.

Aeronautics Act Rewrite?

Whether Sen. Pat McCarran's new demand for a rewrite of the 1935 Civil Aeronautics Act will revive the Cooper subcommittee, set up to do the job, is questionable. The subcommittee has shown no sign of action

since the death of Sen. Charles McNary, former chairman of Senate's Commerce Committee.

The outside demand on talks between Sen. John Breaux, new AAI committee chairman, and Sen. John Sherman Cooper, chairman of the subcommittee, Sen. Robert Johnson, a member of the subcommittee, is thought that it may be used as a sounding board for unbalanced advice.

Each year for the past several years, McCarran has proposed reviving the act to regulate airlines, create an independent safety board and consolidate all international aviation.

Civil Air Problems

Among civil aviation government and industry problems facing the President in 1954 are:

- Post Office Department pressure to cut new airline mail rates on 30 Civil Aeronautics Board. High rate domestic mail rates, last week were faced by F.O. to meet competition (see p. 67).
- Civil Aeronautics Board tendency to pressure its previously established airline route pattern vs. Administration pressure to reduce subsidies by changing some routes.

- Technical development holding up civil and military programs include: high type of distance measuring equipment (congestion and) and high-altitude approach lights (holding up) to meet in fiscal 1955.

Subsidy Justification

Local service airline supporters will add a national security argument to their 1955 subsidy justification before Congress. Previous local service subsidy budgets were matched largely upon the benefits of local convenience.

Scheduled DCL 5 air service, whose surface transport is much slower, can promote industry decentralization-a major requirement for increasing U. S. security.

Freedom of flight subsidy is \$25 million a year, as congressmen may only ask half the actual cost of the service.

More Airpower

Two retired Army generals are continuing their campaign for more emphasis on airpower and less on surface forces. Lt. Gen. Albert Wedemeyer, now a director of Aero Manufacturing Corp., and Brig. Gen. Hanson Fellers. Both looked the Republic down, led by the late Sen. Robert Taft, to cut ground forces in Europe and put the effort into airpower.

In testimony before the Senate's Strategic Metals Subcommittee, supporting Western Hemisphere anti-inflation, Wedemeyer said, "I have never seen a stronger case for any military leader whose judgment is respected to the effect that we could definitely hold it off from Western Europe if war were to occur tomorrow. My principal employment of these surface forces would be to make the effective employment of airpower."

Local Airlift Retention

Post Office Department plans to retain the right to authorize mail airlift on local service lines in the event Route 1 efforts emerge to make out competitive surface transport facilities.

P. O. dropped its 30-cent-a-mile local mail airlift on Christmas Day.

—Washington Staff

AVIATION WEEK

AIA Sales Forecast for 1954: \$9 Billion

- Aircraft manufacturers will equal 1953 record, with military output remaining at 1,000 planes a month.
- But industry association presses program to insure sound base for expansion in case of national need.

Aircraft sales in 1954 will approach the \$9-billion level estimated for 1953, the highest in the history of the industry.

Aircraft Industries Assn., a year-end review and forecast, also predicts:

- Unit production of military aircraft will remain at the present level—about 1,000 planes a month, after which it gradually will taper off. Military aircraft output during 1953 represented 90 to 95% of the volume of work performed.
- Present production trend will continue to advance weight, making its peak in the second quarter of 1954. A decline is expected then, although not to as marked degree as the advance in weight. Deliveries of refueling aircraft in 1953 were about 150 million lb.
- Increased production of helicopter and utility aircraft for commercial use with a further decline in transport aircraft output.
- Employment will not exceed 775,000 and, beginning with the second quarter of the year, will drop to near 715,000 by year's end.

In December 1953, approximately 770,000 workers were engaged in aircraft production. Counting employees of subcontractors and repair facilities, the aircraft production workforce is estimated at more than 1 million.

- Continued continuation of the intensive subcontracting that started the Korea war expansion program. Prime contractors will perform more work as their production rates are reduced.
- New jet fighter models will reach volume production, and deliveries of jet bombers will continue their increase. Post-delivery of a halfway transport model for the military are in progress.
- Jet aircraft production will increase and, by the end of 1954, may comprise 75% of the monthly military aircraft deliveries.

Last piston engine bomber production will be delivered during 1954. Last year, for the first time, the number of jet-powered planes produced exceeded piston engine output.

Program Office-AIA cited for ac-

tion to ensure that reductions will not decrease effectiveness of the industry in its ability to expand rapidly in the event of a major emergency.

Points listed by AIA as necessary to reach policy and programing:

- Maintenance of a strong and active program of research and development, irrespective of possible developments in the international situation. Such a program should use the full competitive values of a commercial aircraft industry.
- Maintenance of a sufficiently broad production base within the industry to permit rapid expansion in the event of an emergency.
- Maintenance of a going rate of production sufficient to hold together an important nucleus of engineering and production talent and to provide the military services with the latest and best weapons.
- Recognition of the vital importance to national security of a healthy, steady, and continuous expansion of the private, military-industry-financially strong and unobscured by a policy that limits its profits on sales to less than half the national industrial product average.

Production of military aircraft increased approximately 5% over the 1952 output. The increase in unit production to an estimated 1,800 in 1953 from 3,500 in 1952 was needed by an even greater percentage increase in aircraft weight as many and larger units of aircraft were sold for business purposes.

Helicopter production reached an all-time high and commercial aircraft production was strong. For the second consecutive year, the backlog of helicopter manufacturers exceeded \$500 million.

World Bookings-Airways increased in the production of guided missiles with several new types being delivered on a production basis. Unfilled orders for missiles were well over \$1 billion, although delivery rates proved monthly.

Since volume of the U. S. largest aircraft companies probably will exceed \$5 billion in 1953, compared with 1952 sales of \$1.7 billion. This is the largest volume of sales reported by these seven since World War II.

Profits for the year are estimated at \$302 million or 3.3% of profits to sales. This level of profits to sales compares to a 1953 average of 4.5% for all manufacturing industries.

In the materials field, major problems facing government and industry in the production of defense industry events included a requirement of 250,000 tons by 1954. The Defense Mobilization Board is working to produce an additional 20,000 tons of space annually within the next three months (see p. 15).

• Significant Changes-AIA lists the fol-

Year	Production
1950	1,000*
1951	1,000*
1952	1,000*
1953	1,000*
1954	1,000*

*Estimated 1954 built after June 1953

• Significant changes taking place during 1975.

• Substantial reduction in the 1958 annual defense budget—especially in appropriations for procurement of aircraft, which amounted to approximately \$4 billion.

• Broad reorganization of government responsibilities.

• Reopening of aircraft procurement, which eliminated four future production schedules, certain older aircraft types to provide added funds to current orders for newer models.

• New Administration policy to narrow and disperse the production base that resulted in phasing out some of the major subcontractors and factories who had been brought into aircraft manufacturing during the post-Korean expansion.

Copter Operations Increase in Alaska

Contract copter operations are making steady increases in Alaska, reports Rick Helicopters of Los Angeles.

The company cites its own 1953 operations, flying 13 copters for a total of 6,200 hr, as work for the Army Map Service, U.S. Coast & Geodetic Survey and U.S. Geological Survey.

In comparison, last reported two helicopter under contract in Alaska, in a total of five C-47 light helicopters during 1953, four C-47s for nearly 2,000 hours in 1955, 10 in 1957 for just a few hours less than 5,000.



FSF Presents Air Safety Awards

Winners of the 1974 awards for "achievement in safe utilization of aircraft" were announced annually by Flight Safety Foundation on behalf of Aviation Week, an arm with FSF managing director James Leffler (formerly former federal representative at the organization's annual award dinner, at San Bernardino, Cal. The dinner was held in conjunction with FSF's annual air safety seminar (Aviation Week Dec. 21, p. 17). In photo above left to right: Dr. Ken S. McElwain, secretary president of industrial hygiene at Harvard School of Public Health, who was honored for his book, "Human Factors in Air Transportation"; N. G.

AF Settles on \$13-Billion Budget

New fiscal program is geared to buildup of 137 wings, probably will face some opposition in Congress.

Big slice of the \$13 billion-plus military budget for fiscal 1975—about 40% or \$13 billion—will go to the Air Force in line with the Administration's decision to concentrate air power in the military defense program.

It will top USAF's current fiscal 1974 budget of \$11 billion by approximately \$2 billion and is geared to achievement of a 137-wing goal by 1975. It would increase to \$15 billion the total appropriations to USAF in the three and a half years since the Korean outbreak.

Air Force generally seems satisfied with the final outcome of the Joint Chiefs of Staff's review of the military program and the fiscal 1975 budget. It appears doubtful USAF will give much support to any move on Capitol Hill for a larger boost in aircraft funds.

• **Denouncing Antagonism**—USAF's Assistant Secretary in charge of the budget, H. Lee Walle, works with both the USAF military and Defense Department's comptroller, Walter McNell.

As Force antagonism to McNell, whose reserve demand status aroused USAF suspicion of possible, seems to have diminished Capitol Hill attack last year on the Administration's \$5-

billion dash in the AF budget were directed primarily at McNell and secondarily at Defense Secretary Clement Wilson.

But criticism in Congress, nevertheless, is likely.

• **Some supporters** advocate do not let the conflict from AF's 147-wing goal and do not think JCS has given the enough in supporting air in the new program.

• **Wilson's** endorsement of 748 planes from the USAF program will be shared with the JCS. The JCS will not put on its argument that no combat planes have been eliminated in the process.

Through reduction in land force and maintenance, technology-related planes have been taken out of the program to be put back at a later date, they claim.

• **Budget Outlook**—Appropriation requests will not be allowed until the President releases the budget to Congress, probably the third week of January. But this is the outlook.

• **Current** and related procurement request will not be allowed until the President releases the budget to Congress, probably the third week of January. But this is the outlook.

The \$15 billion is considered a level of rate that will be achieved. The \$10 billion appropriated in fiscal 1971, 1972 and 1973 provided for the buildup. A 50-billion per cent requirement rate, however, probably will be sustained until USAF's unmet needs for procurement, now \$10 billion, is reduced.

• The trend will be toward less emphasis on spare parts and engines, leaving a greater portion of purchasing funds for airplanes. This is due to new ground rules, already set for spare parts purchasing and now in progress for engines.

USAF wants only 28 to 10% of total plane cost for spare parts and parts, compared with 61% a year ago. Life expectancy of the 147 engine has been increased from 150 to 300 hr, halving the replacement requirement. Yet many are being made as often engines, with plans for extending their life expectancy.

• There will be no deep interest in the request for new guided missile money to allocate a needed switch from guided planes to USAF composition. This area is expected to approximate \$10 billion.

• Research and development request

will keep the program, which has already expanded since the Korean outbreak, at its current level that involves \$490 to \$580 million a year in obligations. More emphasis will be put on air defense weapons in the program.

• A major expense in USAF research and development facilities, probably more than \$100 million, will be projected.

• Personnel funds will provide for only a maintenance of USAF's current strength of 950,000, despite an increase in the number of wings. Air Force is reluctant to better utilization to accomplish this.

Under Project Native Son, overseas military personnel leaving the service through several attention are being reduced with fewer nationals. To add this to releasing military personnel for other duties, this program has saved an estimated \$100 million so far by cutting war dependent costs, overseas transportation, replacement training, and taking advantage of lower foreign wage scales.

USAF also is taking steps to eliminate the 70,000 who were in surplus this spring, encouraging them to leave the service or transfer to strategic skills.

Plasence Starts Study Of H-21C Breakup

Detailed investigation is underway to determine why a new Piasecki H-21C Work Horse broke in two while undergirding drive and pulley tests on Dec. 25, a company spokesman says. The two-door rotorcraft engine came apart just ahead

of the engine section, but the pilot parachuted safely.

Early studies indicate the failure was structural, because parts have been found scattered over a considerable area. There has been no action to ground the H-21C type except as a result of the most recent Avionics War is told.

The H-21C is the latest production rotorcraft in the Work Horse series—powered by a 1,425-hp Wright R2120 engine, compared with 1,150 hp for previous types.

Short to Help Build New Bristol Britannia

(McGraw-Hill World News)

London—British Aerospace Co. has licensed Short Bros. & Harland to build Britannia airplanes and expects this assembly line eventually will increase production of the turboprop transport to 30 a year.

The contract indicates British has built six airplanes for its four-barrel line. So far, only British Aerospace's own Corp. has placed firm orders for 11 Britannias. The Queen's Royal Air Force has ordered a number of new aircraft, and seven other airlines are talking about buying a total of 51.

There are in addition to an estimated 100 existing non-military versions of the Britannia that will be produced by Canadian for the Royal Canadian Air Force.

• **Largest Floor Space**—Short's plant at Belfast, Northern Ireland. The two-door rotorcraft engine came apart just ahead

Scheduled to be built there under British's subcontractor, or Britannia Mk. 101s and the planned Mk. 150. Prototype of the Mk. 150 measures 124 ft. 3 in., longer by 18 ft. 3 in. than the earlier Mk. 101, and is powered by four Pratt & Whitney 730 turboprops of 4,150 hp each.

The Mk. 250 dimensionally will be the same as the Mk. 101, but its design will enable it to carry passengers and freight.

The subcontractor will build half of the transport, supporting the remaining parts from Britain.

Short Firm—owned 83% by the British government and 20% by private investors—has a subcontract to build 17 of the Britannia C-2 jet transports, or producing its own S-30 Sea King for the Royal Navy (Aviation Week Dec. 21, p. 41), and is manufacturing parts for the Supermarine Swift fighter.

• **Supposed** Mk. 100-06 BRAC's order for the Britannia, 15 for the Mk. 140—initially verbally—agreed by the higher-powered, rotor 30% The aircraft also has ordered 13 Mk. 300s including three long-range versions with options for two new, and plans to purchase five Mk. 350s.

Quantis intends to lose an passenger-freighter version.

Port differences at production Mk. 100s, powered by Pratt & Whitney R2120s, may not be scheduled for delivery to BRAC late this year.

The center probably will have the 70-ton transport in service in North Africa. It is noted by late spring or early summer of 1975—about three years after the passenger's first flight.



New Grumman Sub-Killer Catapults From Baby Flattop

New two-engine Grumman SIF-2 catamaran plane is set to push down the deck of combat carrier USS Midway during qualification trials. SIF-2 is the first sub-killer plane of standard configuration to be launched and retrieved aboard a CVE-type carrier. In 1946, a Ryan Fireball fighter, powered by a piston engine in the nose and a jet in the tail, also operated from a small aircraft carrier. The SIF continues the launch and kills function

of sub-killer aircraft now handled by two separate plane working as a team, one carrying detection gear and the other with offensive weapons. SIF-2 has two engines, but, partially dependent during takeoff, short takeoff and multi-section deck operations in the upper portion of the wing part of the ship. Powerplants are two 1,425-hp Wright R2120s. Fuel has been loading gun with some added in addition to fuel tank.

DMB Plans Titanium Production Buildup

The Defense Mobilization Board has approved expansion of the titanium program and the plan is to contract for \$75 million in plants and equipment to increase production to 20,000 tons at a price, usually within three months.

The action follows testimony by the Air Force and security manufacturers before the Senate's Strategic Metals Subcommittee that production of the metal is drastically short of requirements (Aerospace Week Oct. 26, p. 14, Nov. 7, p. 22; Dec. 7, p. 14).

Before the subcommittee, headed by Sen. George McGovern, located on the critical bottleneck in the support program, Office of Defense Mobilization and General Services Administration lodged an expanding titanium request.

DMB cut Defense Department's recommendation of a goal of 15,000 tons annually to 1976 to 25,000 tons. CSA has contracted for 11,000 tons of this expansion to its Production for 1975 was only 2,400 tons.

The board, composed of Cabinet or cabinet-level agencies, is charged with efficient coordination.

- **DMB establish a titanium committee** of top-level experts under the chairmanship of a person coordinating public export and confidence and will be split to assume such an assignment.
- The committee would "immediately develop" a titanium expansion program, working in cooperation with Air Force and other interested agencies.
- **CSA move forward** in negotiating contracts up to the present 15,000 tons goal and go beyond that if possible.

Leading candidates for contracts for additional titanium expansion are Titanium Metals Corp. de Saint-Nicolas Co., and Monrovia Chemical Co.

Titanium Metals and de Saint-Nicolas Co. has a contract to produce 3,600 tons a year. The other company is in the group production program, Chas. Co., has a contract for 6,000 tons a year but will not get into production until 1975.



Marlin Displays Its Narrow Beam

Streamlined high length-beam ratio built of aluminum. Marlin F35A-1 Night Pylon bomber being built at defense building in the location view of the plant in Erie, Pa.

contractors will be offered-early advance against future production, but no contracts in new plants and market guarantee arrangements.

New Airline Begins West Coast Operation

A new scheduled airline plan to start operations this month, serving Spokane, Boise and Seattle. The line is owned by the Inland Air Service of Minidoka, Mont., which for years has supplied pilots and planes to the U. S. Forest Service in Pacific Northwest states.

William Lockwood, operations manager and chief pilot for the line, says Civil Aeronautics Administration has granted an airworthiness certificate for first route trips daily between Spokane and Seattle with an intermediate stop at Boise.

Lockwood plans to operate DC-3 coaches for passenger and freight service and will add a C-45 if freight warrants. Passenger rates \$39.95 plus tax between Spokane and Seattle, \$59.95 between Spokane and Portland.

Industry's Major Task Is Air Buildup: Peale

Two major objectives the aircraft industry must concentrate on during 1974 and 1975, says **Manly S. Peale**, Air Force America Corp. president, are: • **Reach and hold** production schedules established for new planes by the armed forces in the buildup of national air strength.

• **Prepare** for volume production of still newer jets that will be needed in the 1980-90 period.

Peale, president in a year-end forecast that production will remain relatively steady during the next 12 months. In 1973, the industry delivered to the armed forces approximately 17,300 new planes, he estimates. He sees the production rate of about 1,000 military planes per month will continue with slight variations well into 1974.

The rest that a young aviation

(aviation) that has had a helicopter after history can now assume such status in the overall economy," he says, "emphasizes the need for being ready in aviation, as well as the need for ready study of all problems relating to the aircraft program policy."

The continued prosperity of the country, which is not its military safety, is very significantly bound up with the procurement of a stable and solid aviation industry.

Peale reports the most formidable problem of business and aerospace flight are being solved. "We know now that there is financially no barrier to speeds up to that of light itself—if that is what we need."

Jet Liners Will Be Easy to Fly, Pilot Says

First of future jet transports will not even be to "banned" as they find transition from conventional four-engine airlines difficult, Edwin Reber, Boeing Airplane Co. test pilot, says.

Reber says the transition "will be simpler than switching from two- to four-engine airplanes" and claim they will be but a minor factor in choosing transport pilots of tomorrow.

• **Unmanned** "spaceplanes," in building a prototype jet transport that is scheduled to fly late this year (Aerospace Week Jan. 2, p. 12).

Reber says the company has gained a background of experience with jets, all-engine aircraft, transonic air where in the world through production of B-47s and B-52s.

"We at Boeing like to consider ourselves as thinking today in terms of the airplane, which is the only machine of yesterday," Reber told a joint meeting of the Institute of the Aeronautical Sciences and Air Line Pilot.

"I mention this to dispel the misconceptions that every of our airline pilots today have been flying multi-engine jets."

"Many people are of the opinion that because jet has greatly increased speeds and operates at higher altitudes than piston jet airplanes, pilots will necessarily need to be of the superior type. That, in fact, has no effect by the simplicity of jet engines, superconductors in propulsion, new safety features and simplified cockpit instrumentation, to mention only a few."

• **Laurel** Aero-Boeing studies that current ideas concerning three- or four-engine aircraft because America has been developing its turbine engine production in the military for defense.

"Because of this," he says, "the general public has had the very best access to information on the subject."



ADVANCED BUSINESS plane designs has somewhere between characteristics of Conquest 340 and Conquest 350 types, reports Hewitt.

Business Flying

Market Research a Key to Business Plane

By Frank Sheu, Jr.

The job of determining a true engine business plane design that will meet requirements of the major portion of the business flying market only gradually with the manufacturers, according to a specialist who recently completed an exhaustive survey in that field.

"Need for such a design is acute," says Robert Hewitt, president of the business flying consulting firm of Robert Hewitt Associates.

• **Old Design**—He points out that over 85% of the business flying planes currently in operation are based on designs of 1955-1956 vintage, while the remaining 15% were built to have single-engine owners into a low-priced twin class.

"What is needed is a 1974 design which will reflect the rapid technological advances made in aviation over the past 20 years," says Hewitt. "This aircraft should be based on predicted new requirements, dictated by strong economic factors as well as pilot performance considerations. It must be employed for day, night and instrument conditions."

"But," he continues, "before such an aircraft can be designed, developed, produced and sold, manufacturers must give more consideration to the utilization of the product to the specific market."

• **Ideal Design**—He would agree, Hewitt adds, that the "ideal" business aircraft design lies somewhere between the performance characteristics of the Conquest 340 and the Conquest 310. He adds that the 140 owners could be intended to include a jet type in the foreseeable future.

But for the present, he estimates that a 140 type might satisfy about 30-20% of the current owners, while types in the performance range of the 170 and lighter should satisfy a larger portion.

"Specifications for the plane that will appeal to the vast market should be found within the range of the performance characteristics of these two models," Hewitt observes. "But how do we arrive at these specifications?"

"The problem is one of marketing and sales, not the ability of the aircraft industry to adequately design, produce and financially support development of the right business aircraft," he contends. "This ability is a proven fact as represented by the types of aircraft, volume of business and air travel of the manufacturers who supply the business market."

• **Answer**—Needed-A marketing research and sales program, he says, will develop the business flying market. • **What to build?**

• **How to sell?**

As indicated with the market research trend in general business today.

What Are Your Views?

An article in the Oct. 5 *Aerospace Week*, which mentioned that a new information source for the business flying field has been made available by the firm of Robert Hewitt Associates, aroused such widespread interest that the editors have again interviewed Mr. Hewitt, regarding his views on the possibility of arriving at a new business plane design.

Aerospace Week plans to continue this series of articles on business flying, and aviation economics, views and opinions from those directly engaged in or interested in the industry, and who will be important aspects of aviation.

Answering *Week* plans to continue this series of articles on business flying, and aviation economics, views and opinions from those directly engaged in or interested in the industry, and who will be important aspects of aviation.

• **Life**—Hewitt's approach to the development of business aircraft, offered products and services a broken down

Hewitt notes that complete business aircraft marketing research is almost nonexistent, primarily because the industry has been under constant pressure. If the military requirements and the business aircraft market has only recently attained a status of major importance.

"For the most part," he says, "sales to date have negotiated with the proper approving the salesman, rather than as the result of a sales program which follows the selling staff—product analysis, approach, establish the need, present the solution, demonstrate the product and close the sale."

• **1,000**—Twenty-five of the largest marketing and sales efforts since 1946, he adds, have resulted in aircraft company has increased from fewer than 90 airplanes to approximately 1,000 today, with approximately 92% converted from military and airline operations.

"Having had ideas on a program which might be followed in business aircraft development," Hewitt says, "Much credit must be given to the present aircraft industry for their pioneering in this new mode of transportation, as well as to a few manufacturers, executives and fund-hunters operators."

"But continued business aircraft ownership, operation and development depends largely upon the industry's approach to the market first in offering the prospect's transportation requirements at a fair price which will be mutually profitable to all interested parties and, secondly, in their ability to secure the cooperation of the business aircraft owner in obtaining data necessary to the development of new products and services."

• **Life**—Hewitt's approach to the development of business aircraft, offered products and services a broken down

Airline Hostesses: 32 Too Old?

Problem of the age is facing U. S. airlines. Where does a stewardess lose her appeal and staid?

American Airlines sets age 32, and has asked 75 of its 1,100 stewardesses who are that age and over to resign. Other airlines have considered similar moves. The Air Line Stewards and Stewardesses Assn. promptly stepped in, provided upon AA to delay acting a date pending further study.

"It is the policy of American Airlines," a company bulletin states, "that all stewardesses shall be less than 32 years of age.... It is based on the established qualifications of stewardesses, which are: an attractive

appearance, pleasant disposition, even temperament, courteous, unmarred teeth and skin and desire to meet and serve passengers. Basic among these qualifications is an attractive appearance. Such an appearance certainly is found to a higher degree in young women."

AA's plan is to give each "over-age" stewardess one week's termination pay for each full year of employment up to eight years maximum. Women's groups are entering the argument, protesting the move as a slight against American women-kind.

The union is backing on such points to squelch the whole affair.

into those separate stages, namely: conception stage, planning stage, execution stage.

Explaining the program, Hewitt says, "The conception stage covers a survey or study of the market to determine its potential and to establish the Who and What of the market. 'Who will buy?—What will they buy?'

"Completion of these phases will bring out certain requirements which should be incorporated into the tentative product design. Next step is to prepare the tentative products. This would be a close-test to determine which of a selected number of designs would best meet the prospect's requirements."

►Stage Two—At this point, he notes, manufacturers that a report on the program should be prepared from which management can make the decision-to continue or not to continue through stage two, the planning stage.

"The planning stage," he continues, "involves first the building of the prototype as prototypes. The next stage would be created an immediately. The physical market test of the prototype would be through demonstrations to a pre-determined cross-section of the market, concurrently developing the marketing or sales plan and incorporate within the action plan features determined from the demonstration phase. Production plan is developed at same time as marketing plan."

►Stage Three—At this point, he says, the necessary facts and figures should be available for the management decision.

"Final stage, the execution stage, covers management's coordination of the plan developed," Hewitt points out. He explains that breaking points between each stage are designed in order that management's test and evaluation may be made at completion of a complete unit in the program, with each being a definite break in the program's movement factor.

These stages could be subject to overlap, he notes, brought about by conditions which arise at the time the program is put into operation.

Although Hewitt's outline is applied to an aircraft, he emphasizes that the same factors and program could be applied to other equipment or services with minor changes in procedure and subject data.

In concluding, he says an aircraft manufacturer adopting such a program should be presented a lucrative market. United U. S. firms hungry for an aircraft designed specifically for their business flying requirements. He adds, "Until an active, organized program for collection and evaluation of information is put into effect, the 'blind' business aircraft will never fly off the drawing boards."

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Close Look at Short Sherpa

Short Sherpa experienced yet another phase, which will test characteristics of semi-automatic wing configuration, is detailed in this case of the plane being flown in the Northern Ireland. Top photo shows Sherpa being maneuvered out of its hangar, under personnel pushing some side of plane's

nose. Short SA.4 (largest bomber), being used the high-altitude research, it is built around. Outer piston, Sherpa flying, shows up look of horizontal tail. Movable wing type (shown at bottom) set at combination of sweep and extension. Forward seats are two small Turbojets in fuselage.

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NEWS SIDELIGHTS

Announcement of an order for DC-7s by Pan American World Airways has caused confusion of those who wondered what PAA was going to do to compete with United's DC-7s on the high Honolulu route.

Ryan Aeronautical Co. believes the report is another overt act publicizing that Navy had decided against its sale by sale transfer in the competition at Pensacola may have prejudiced its case. The report, later labeled false by Navy, appeared while the competition in Florida still was under way.

Early company investigation indicates that crashes of two Northrop F-56Cs during unscheduled cockpit maneuvers in Wisconsin may have been due to control handling during aggressive dives.

Estate of Ron Sagar, former Michigan governor and aviation leader who was killed Nov. 30 when his plane struck a television tower, says (AVIATION WEEK Dec. 7, p. 7), is filing a damage claim as a result of the crash. Tower was destroyed and owners of the new television station say start of their broadcasting operations has been delayed a year.

Present five-year plans for a new Japanese air force call for an increase of 100 to 150 light fighters during 1954 over present strength of 30-40. Five-year plans are based on a strength of 700-800 jet fighters. Observers expect an independent air force, separate from the army, when the guns mature. At present, there is no separate Japanese air force, merely an air arm of the so-called National Safety Force.

It hasn't been revealed, but USAF, in an effort to boost F-35 performance in Korea to meet the altitude and rate-of-climb advantages of the MiG-25, equipped some Sabers with Brite units. Although the auxiliary units were unsuccessful, the idea of using such boost to give U.S. fighters super performance when needed has not been dropped.

When adding up costs for guided missiles, don't overlook the possibility of a breaching capsule capable of travel through either water or air. A submarine could fire such a capsule without necessity of surfacing.



DEER FRIENDS High ranking hunting party members recently at such events as Lupton, Mich., above voted both in and out. Left to right (clockwise) Television star Arthur Godfrey, Defense Secretary Charles E. Wilson, Fairchild Aircraft President Richard S. Kornblith and General Motors executive Stanley J. Earl. Standing, left to right: USAF Gen. Curtis LeMay, GM executive J. R. Sullivan and hunting boss Harold K. Hunt. Below, 2500 exclusive and finest herd of America's Production Ranches.

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Convair, IAM Reach Wage Agreement

San Diego, Calif.—Settlement of the last of the major West Coast aircraft labor contracts still under negotiation has been announced here. Convair and the International Association of Machinists (IAM) reached agreement on a contract calling for a 30-day wage increase of five cents hourly, plus a one-cent cost-of-living allowance.

The agreement, covering 11,000 employees at Convair, followed the industry pattern set after United Auto Workers (UAW) and General Motors (GM) reached a similar agreement in a seven-week strike at North American Aviation.

Retrospective Convair employee benefits were increased and vacations became more generous from 15 to 20 days a year. The contract, retroactive to Dec. 18, is for one year.

Convair estimates the increase will cost the firm \$5.5 million.

A similar contract between Selsco Aircraft Co. and the IAM also has been reached. The Selsco agreement calls for a 30-day wage increase of five cents hourly, plus a one-cent cost-of-living allowance.

Meanwhile, NAA reported it was in serious talks with production and deliveries will be back to normal by February. The company had F-100 production would be an absolute despite the strike.

Although announcement of a similar deal by NAA the day after the strike ended seemed some comment, the company explained it was a scheduled dividend, the financial of both of the strike would be felt later.

Swiss Plan Domestic Helicopter Service

Switzerland's domestic air routes probably will be flown by helicopter exclusively when reestablished, the director-general of the Federal Air Office has predicted.

Dr. Markus Reinhard points out that the "system of Europe sets two parts of the sky divided in two. One part is a base in the Swiss because many foreign carriers would otherwise not be allowed to utilize Switzerland's three international airports." These are at Basel, Geneva and Zurich.

Italy Builds Small, Inexpensive Cooper

(McGraw-Hill World News)

Rome—A small helicopter, weighing approximately 600 lb and designed to cost \$12,200 when produced in quantity, will be tested soon at Caprioglio Airport, the semi-official Italian



moment in history

You are looking at a/1000 of a second in the history of aviation. It occurred at a fraction past 4:31 p.m. on January 25, 1959.

This was the Zero moment, which marked the official launching of the first successful guided missile to be approved by the U.S. Air Force—the Martin B-61 Bomber.

The picture is historic for a very significant reason: it records the tradition-shattering payoff of an entirely new development in the aircraft industry, known as Martin Systems Engineering. This is a science and a method of

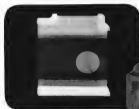
developing systems systems as total solutions of Operations problems.

The Martin Bomber is far more than the thing you glimpse here. Behind it is an integrated network of facilities designed to give that important new weapon the pliancy of operation and extreme mobility. These components add up to the total solution of one of the most formidable security problems of our time.

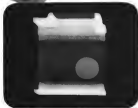
They also add up to one of today's most important developments: the full story of Martin Systems Engineering. You will hear more about Martin!



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Radiograph shows recurring irregularities due to shrinkage.



A change in gaging produced sound castings.

RADIOGRAPHY

puts the finger on
a profit thief

Shrink was a problem in casting this instrument housing of 343 aluminum. It looked like the yield would run low.

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newspaper El Montecarlo reports.
The carrier has been built by the Israeli Works near Udim. Designers are Chas Lash and Sergio Yonah.
The craft is powered by an 85 hp. Continental engine and is designed for cruise at approximately 75 mph, according to reports. Range is given as 24 hr. Non-refuel diameter is said to be about 24 ft. and diameter of the tail rotor is 4 ft. Fuselage is approximately 20 ft. long.

Asks Bay Stop

Rene, Venezuelan airline, has applied to the Mexican civil air authorities for permission to land at Montego Bay on its Miami-Caracas route now that the Peninsula report has secured more adequate lighting facilities. Aerolineas, the Cuban airline, is seeking its weekly Consolidated flight 231 Colon home operating between Bogota and New York via Miami through Montego Bay.

Air Tourists Boost International Trade

Encouraging Americans to fly abroad on U. S. flag services is a vital aspect of increasing international trade, Air Transport Assn. reports.

U. S. tourists spent more than \$1 billion in foreign countries during 1952—more than three times as much as in any U. S. report except coffee, Asia E. S. Land, former ATA president, points out in a letter to Clarence B. Randall, Chairman of the Commission on Foreign Economic Policy.
Declining ATA's position as the position of expanding international trade, Land says the tourist travel is one of the "flexible methods" for increasing the dollar savings of foreign countries.

Great Britain and France earned more dollars from American travelers than from any other single source, he says.

Civil Aircraft, Engine Shipments

	October 1951	September 1951	October 1952
Complete aircraft	215	359	293
By weight of aircraft			
Less than 3,000 lb.	208	333	245
3,000 lb. and more	27	26	48
By number of planes			
1 to 5 planes	208	333	245
More than 5 planes	27	26	48
By total rated hp., all engines			
Up to 199 hp.	308	333	245
400 hp. and more	27	26	48
Total value of completed parts (\$100,000 and over)	\$29,497	\$30,187	\$30,165
Aircraft total	20,236	22,047	20,817
Less than 3,000 lb.	1,034	1,815	1,315
3,000 lb. and more	19,202	20,232	19,502
Engine parts	9,261	8,140	9,348
Total of aircraft engines and parts (\$100,000 and over)	\$21,497	\$21,187	\$21,165
Aircraft engines	9,883	7,121	7,888
Engine parts	7,614	7,390	9,499

Civil Plane Shipments Drop 14%

Civil aircraft industry shipped 215 planes valued at \$12.2 million and weighing 612,000 lb. during October, a sharp report of the Census Bureau and Civil Aeronautics Administration reveals.
This was 14% below September shipments of 259 planes valued at \$13.1 million.

The industry also shipped 494 engines with a total of 653,300 hp. This is a 6% increase in number of engines and 11% increase in horsepower over September shipments of 465 powerplants.

October civil engine shipments were valued at \$5.1 million.
Unfilled orders for civilian planes of 3,000 lb. and more weight and over amounted to 519 at the end of October, about equal to the backlog at the end of September.

The report shows 1,699 civil aircraft totaling 5,771,000 lb. shipped during the first 10 months of the year. Value of the shipments amounted to \$182.6 million, compared to \$164.5 million for the same period of 1952.

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Martin Boosts Canberra Performance

By simple fixes, such as improved gap sealing, company has added 30 knots to speed of B-57A before huffing begins.

By Irving Stone

Baltimore—In the tradition of English Electric Co.'s Canberra bomber design to USAF's B-57A night intruder version, Glenn L. Martin Co. has stuck very close to the plane's basic configuration. This was an Air Force acquisition.

In addition to minor cosmetic changes (Aviation Week July 23, 1981, p. 19), there have been alterations for performance improvements, but these good bag dividends. These improvements have been effected with comparatively little expenditure of effort and time.

G. E. (Pat) Tibbs, senior test pilot and Martin's manager of flight tests, probably is more familiar with the comparative performance of the B-57A and the Canberra than any other U. S. pilot. In an interview with *Aviation Week*, Tibbs and other Martin personnel commented on some of the performance details concerning general aspects of these planes.

► **Expanding Potential**—Tibbs believes the B-57 has great potential for future development. It compares, he contends, with a lot of lightness in maneuverability and its ability to operate at extreme altitudes.

At low speeds, because of compari-

tive light wing loading on the B-57, still as he approached closely and accurately made with minimum loss of altitude. It is this characteristic of the plane that increases the pilot's willingness to take advantage of its maneuverability at low speed, Tibbs says.

One example of how the plane's potential can be exploited is revealed in a simple engine cooling job Martin has made. This adjustment has given the B-57A a Mach .09 speed increase at high altitude before reaching the degree of roughness experienced with Britain's Canberra, Tibbs says.

Martin has tested for Canberra up to the maximum weight at which the B-57 is flying. Actually, this was an evolved condition for the Air Force and Canberra. This arrangement has given a pretty good idea of performance comparison for the two planes, Tibbs says. The additional thrust of the J65 is giving the improvements required.

► **Control**, Cockpit, Fuel—Control forces are slightly lower on the B-57A than on the Canberra, Tibbs reports. This very desirable condition probably stems from a better airframe sealing job obtained in converting from British to American standards, plus the fact that the three control surfaces—elevator,

ailerons, and rudder—have slightly lower spring rates in the B-57.

The general cockpit arrangement in the B-57A is unusual, that of the Canberra in conformity to U. S. standards of today, Tibbs says. Albert J. Ferry, project engineer on the B-57A, reports that all American equipment has been installed and the arrangement changed for panels, control wheel, etc.

The radio operator-console, normally seated directly directly aft of pilot in the Canberra, has been eliminated and this space replaced with an equipment area. This leaves two crew members in the B-57A—pilot and navigator, who also is a general assistant.

► **Cooling**, Brakes, Canopy—Air conditioning in the cockpit is another feature of the B-57A. Tibbs says he saw the need for air conditioning as soon as he flew the Canberra, where cockpit temperatures could reach 140°F.

In the Canberra, the only cooling to naturally hot air from the engine exhaust is what is obtained in the ducts between the bleed point and the cockpit. At low altitudes, therefore, the cockpit can be very hot. The simple small ventilation employed was not adequate.

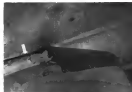
The B-57A has been forced to put



B-57 FINAL ASSEMBLY AREA shows wing and fuselage from ready for joining for trip down final line soon at the left.



PRODUCTION SEAL is rubber-coated bent steel strip (arrow). Closure gap of this is made narrow.



TEST SEALS for vibration: tape on wheel landing edge gap (arrow) during test and compound (arrow) at factory.



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VOLTAGE OUTPUT—4 to 18 mV/g
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WING ROOT RIBS are drilled with all of this periphery tool shown on display.



PERIPHERY DRILLING TOOL has double headed holes for each angle

as an conditioning unit in Canberran used in typical classes. Reports are that air conditioning also is being added to late model Canberrans. Lack of air conditioning in early Canberrans may be attributed to a difference in design philosophy as simply to a belief that it was not needed.

Yoke seem up the station this way. Air conditioning makes the difference between sitting in a seat box and in an air-conditioned office.

The fuselage on the B-57 will ground landing of the plane such that, according to the flight test manager. On the Canberran, a hard brake is used, assisting both brakes, with differential braking obtained by rudder action.

A new canopy is scheduled for a later version of the B-57—probably the B model—and is expected to improve visibility. This new type canopy has been installed up and down on a Martin aircraft Canberran.

Rotary Bomb Bay—Another big improvement already incorporated in the B-57A is the substitution of Martin's rotary bomb door for the conventional clamshell type (Aviation Week Aug. 3, p. 17). Title's view is that something had to be done to bring the performance

of bomb dropping up to the performance of aircraft. He says the new bomb door makes the old type arrangement completely obsolete.

During the last time of bomb door rotation, there is only a slight bullet. After the door has been rotated to open position, the effect is as if the door still were closed, 1/4 inch open. The rotating door will permit bombing runs at the same speed as light-bombing drops when extremely curved weapons. No longer is the pilot of the bomber restricted by the gaping bomb bay and associated turbulence.

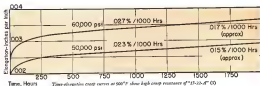
Title's view, in the cabin, are shared by Perry, who says turbulence has been a very serious problem with the old type door—open at low speeds, where bomb-dropping characteristics have been affected.

The rotary bomb doors were present on Martin's XB-51 before adoption for the B-57A. The XB-51 was successfully shown inherent advantages of the rotary bomb door for high-speed bombing runs.

In all probability, the new type door is slated for future planes and is likely to be adopted by other builders.

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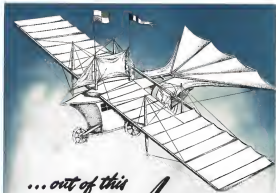
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changes made in the transition of the
Caudron to the B-37, the most im-
portant probably in the design of the
plane's critical speed brakes. Martin
engineered the change in an ingenious
and inexpensive development program.

Martin's Engineering Division indicated the program to deliver greater po-
tential for the plane by introducing its
proved limits of manual control. The
jet kit to the aerodynamics and flight
test departments, with Howard Schulz,
aerodynamics representative on the B-37A,
perkins, and Tibbels handling the responsi-
bility for the task.

The Caudron, like any other plane,
is limited not by power and weight but
by speed limits of manual control.
Limit of manual control can be defined as
a combination of speed and altitude
conditions beyond which control of the
plane is uncertain.

The great limiting factor of Martin's
test production B-37A (there was no
prototype, so said) was a low-fre-
quency buffer. This condition also oc-
curred with the Caudron. The buffer
qualified itself as completely in-
adequate and at a speed condition too
low to tolerate. The buffer affected the
engineer, but was traced to the tail
by means of instrumentation.

► **15 Knot Gale**—To remedy the condi-
tion, Martin engineers adopted an "op-
erational shield" instead of the con-
ventional streamlining scientific approach in-
volving wind-tunnel tests, calculations
and other detailed procedures, which
reports.

The method used to obtain the im-
provement was to seal the tail section,
both internally and externally. English
Electric did some work on internal
sealing in the tail end, on test aircraft,
resulted in sufficient freedom to
overcome the building effect. Martin
engineers wanted better results and
started there quickly.

To expedite flight test results, Martin
engineers used tape to seal light-
ening holes and screen openings. For
example, a paper cone, taped in place,
was used to seal the opening where
the elevator push-pull rod runs through
the fuselage tail fin. On the basis
of the favorable results obtained with
the sealing in the tests, metal-to-metal
production seals were suggested
for these same applications.

Transfused wire actual speed values
the internal sealing resulted in a delay
action of 10 to 15 knots indicated
speed in the appearance of the low-
frequency buffer, which means.

► **Extra Divisions**—Martin's speed divi-
sion was obtained through external
work.

The main method on the B-37 is
by stabilizer adjustment. The method is
used because a reasonable size of
true air and true air difference would not
be adequate when compensation of

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factors are encountered. A movable stabilizer provides adequate time at any low-speed speed for this plane.

Utilization of the movable arrangement involves gips and associated openings at and through the fuselage. To isolate the open area for further improvement of airflow characteristics, Martin engineers sealed the stabilizer at two locations.

One of these locations was in the quarter-round fitting between the horizontal stabilizer and fuselage cone.

To facilitate gap seals, the plane was flown at the high-speed test conditions and loaded with the stabilizer in this position. The gap at the quarter-round fitting was filled with a sealing compound and the plane taken up with the stabilizer in raised. Results indicated that a seal design could be obtained in bullet design.

Still another point of sealing was at the small stab fitting at the leading edge of the stabilizer close to its junction with the fuselage. Two gips were involved here—one clockwise, one opposite. These gips were sealed with waterproof adhesive tape for the test evaluation.

This external sealing resulted in an other 15-knot increase in speed before the low-frequency buffet occurred, Schuch says. That improvement, added to that obtained through internal sealing, gave the first production B-57A a 30-knot advantage over its British counterpart.

► **Improvement at Altitude**—As a result of the study for the low-altitude (under 10,000 ft) buffet problem, an increase of Mach .09 at high altitude (over 30,000 ft) is obtained over the accepted NAF limit for the Canberra in cruiseability efforts. This is a desired advantage with no extra effort except that of making the improvements which were considered necessary for the low-altitude condition.

Scale used in the test runs are being replaced with production types. On the quarter-round fitting, a spigot loaded and extended the entire length of the fuselage's interior. On the stab fitting, production seal is being obtained by the compressing a rolled gip on the clockwise length, whereas the opposite gip is being fitted with a felt filler strip, Schuch reports.

► **Wing Fitting Change**—Despite the fact that the B-57A was to follow the Canberra design very closely, it was known from the beginning that certain changes would have to be made in the aircraft.

One major change was in the "golden gate"—the wing spar carry-through fitting. On the Canberra, this fitting was lagged out of a large fitting. Martin engineers did not want to have the spar, laminar-flow or pre-lagged in sections, because they did not consider

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this approach desirable for production. It was found cheaper and quicker to create a corresponding structure from two 3 in. x 10 in. x 1/8 in. plates and six surfaces. The structure's construction cut out and was then machined.

It is possible that when the new large press under the Air Force heavy press program begins operating, the "golden rule" fitting work may take the form of a single large die. Martin already has prepared this design.

► **System, Accuracy Change-Size** system changes also were made. The hydraulic system was redesigned to a "face out" installation as used on USAF planes. Pressure is 3,000 psi, higher than that of the British plane. The system change was made primarily to that U. S. manufactured equipment could be recommended.

In the field service, Martin showed the Canberr wing (K12148) to provide for the installation of guns outboard of the nacelle at the leading edge.

Generators and hydraulic pump on the Canberr are located in the inboard portion of the wing leading edge, down through a shaft tunnel from the engine to a generator in the leading edge area. On the F 57A, the generator and hydraulic pump are mounted directly on the engine, following U. S. practice.

► **Production Possibilities**—The wing-fuselage mating posed a considerable problem in Martin production. The mating job involved the wing spar, gun attachment, fuel and oil wing fitting attachment, and peripheral mating of wing to fuselage. This latter operation was complicated further by a complicated mating routine. The peripheral portion involved about 300 bolts for each wing panel.

The British method in doing the job was to pilot-drill the wing spar holes to final assembly and size it in a tool (templated) to accomplish the peripheral drilling on the fuselage attaching angle in final assembly.

Then, while the wing was attached to the angle, the pilot holes were enlarged to full size on both the wing and the attaching angle. The wing was stressed and under and strip nuts inserted in the fuselage angle. The wing then was bolted on.

"This comparatively simple method was acceptable considering the British order for the plane. While it did not involve any tolerance accumulation problem, it did mean drilling where not suitable by U. S. standards.

Martin wanted to set the final assembly station by doing dummy drilling, checking, according to Stanley F. Bond, Martin's chief of tooling, plant 2. Also, for order for the F 57A, obviously considerably more than the British quantities, justified a greater expenditure on tooling.

► **Shape Elimination**—Martin did the job the way. Holes were drilled full size in the attaching angle, and angle and strip nuts attached, wing holes were drilled full size, wing and fuselage mated and bolted up.

While this approach, one drilling operation involving about 400 holes was eliminated. The drilling operation was done prior to final assembly, relaxing at final operation to a nut-and-bolt bottom up, Bond says.

Another beneficial consideration was that Martin's pre-drilling was done in a low-bay area and not in the final assembly high-bay area where height as well as length of factory area is a particular factor for complete airplane accommodation.

► **Aluminum Tooling**—For tooling, Martin first made a master dummy fuselage side and from this produced a peripheral tool for locating (and drilling) the main angle at the fuselage. (The perimeter and face and at wing fittings previously had been located independently on the master fuselage dummy.)

Martin also made a master dummy wing root and built a peripheral drilling tool to drill the wing.

Normally, master tools are made of steel and master dimensional comparison problems that can be traced to differences in coefficient of expansion between tool and master material.

For this reason, Martin built the master dummy from the same metal from alloy material to be used in the wing fuselage angle and fittings. This minimizes the problem of differential expansion between tool and master, which could have been serious in view of the long lengths of the wing attachment. Bond contends.

Building the chambers of aluminum alloy also was important with respect to space, which would be expected to mate accurately under different temperature conditions than when each was drilled (some are worked at separate times usually, hence temperature conditions probably are different).

Shielding Need Bars Atom Plane Progress

Aircraft powered by nuclear reaction are technically feasible, but such aircraft are not likely for the near future. These are the views of Dr. William E. Paken, chief of nuclear engineering at North American Aviation, Inc.

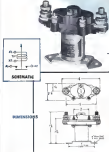
Paken told a recent meeting of the American Nuclear Society (nuclear group of the New York Section) that the most important limitation in the development of nuclear aircraft is the problem of shielding the crew from the radiation of the nuclear reactor in the aircraft. ► **Shielding Problem**—There is no way



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CONTINUOUS DUTY
APPROXIMATE
Approved by MIL-STD-883 per
Spec. MIL-A-6106

CONTRACTS
Army, Navy—Single open,
single throw, normally open,
double throw
Relay—250 amps. maximum
and motor load at 25 v. d.c.
150 amps. inductive at 30 v. d.c.

COIL
15 ohms, 24 v. d.c. continuous
duty. Plug-in 1/2 v. d.c. max.
Drop-out 2 v. ± 0.5 v.

WEIGHT
1,250 lbs. approximate
Part No. T15A-25
300 Ampere Contactors
CONTINUOUS DUTY

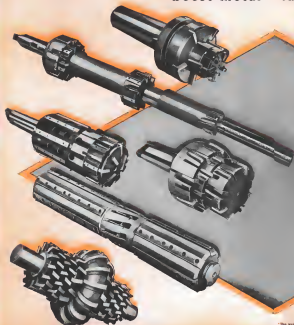
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single throw, normally open,
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and motor load at 25 v. d.c.
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COIL
15 ohms, 24 v. d.c. continuous
duty. Plug-in 1/2 v. d.c. max.
Drop-out 2 v. ± 0.5 v.

WEIGHT
1,250 lbs. approximate
Also available with standard
terminals and side mounting

Aircraft engine and frame manufacturers boost metal-cutting operations with . . .



one-pass OK multiple diameter tools

Over 90% percent of O K tool orders from the aircraft industry are for reamers, cutters, designed to perform one, two, and four operations with one size of the tool. These tools take holdable rough cuts, extend this, make finish cuts, with no run-back as is normal, which has been a leading cause for (change) parts in tool-treated elements for cylinders and high-speed steel for high-speed better finish jobs. Better graduation results are demonstrated! Where, previously, the piece on the floor, was remanded good, today, you find 40 pieces, inspected and passed.

TYPICAL MULTI-PURPOSE TOOLS

DRILLING NEW HOLES THROUGHLY IN SINGLE AND DOUBLE-FLUTE
COMBINATION BORING, REAMING AND CHAMFERING REAMS
BORING AND TAPERING HOLES FOR RADIAL DRILLING
FLUTED TAPERING AND SCREWING TOOLS FOR STEEL HOLES WITH
GANG CUTTERS FOR SLAB MILLING
ORANGE-HOLE PLATES FOR PROOF SLABES

BUILT WITH MORE BEEF IN THE BODY

To better take the punishment of variable milling, O K tools, by virtue of their design, two component design, are better in the body, not the rim, than previous design tools, resulting for other tolerance work, and heavier bodies for hogging jobs. Reams are wedge-shaped. Reams, shanks, face reamed and driven home, never broken. Metal surfaces ground lateral movement, provide an accurate adjustment in comparison for use. Drilling is introduced by 100° for high speed tools. Reams are not confused with reams for hole, cones, pins, pins or patterns. All these, O K are available in various.

FREE CATALOGS

"Machine Milling Centers for Machine Milling Machines"
"Automatic Tool System of Mount Single Point Tools"

THE O K TOOL CO., INC.
Milford, New Hampshire

OK

modern milling cutters
for modern milling machines

"The wedge is the world's strongest
mechanical device"

the components
you need
are listed—



in the new AMPHENOL CATALOG B-3

The new AMPHENOL B-3 catalog has just been released. The B-3 is designed to give general information about the entire AMPHENOL line of quality components—AN connectors, RF connectors, coaxial cables, sockets—everything made by AMPHENOL. It is carefully described and illustrated. From the B-3 you will be able to choose the components you need for quality electronic equipment.

At AMPHENOL, there is a constant concern with quality. In design, engineering and production this AMPHENOL emphasis on quality produces quality components for the electronics industry. New ideas are a major AMPHENOL contribution to electronics. Connectors and cables with application possibilities thought impossible a few years ago are made by AMPHENOL today.

The B-3 catalog also gives a complete listing of special catalogs and bulletins that will prove of value where more specific information is required on AMPHENOL components.

AS TODAY, THOMPSON'S AIRCRAFT WHEELS REAP UPON AMPHENOL COMPONENTS

AMERICAN PHENOLIC CORPORATION
Chicago 34, Illinois

AMPHENOL

of exhausting such shielding with exhaust or plenum high energy nuclear action, the end shielding for ships and belt reduction would be light, but for gamma and neutron emission would require materials like boron, lead, concrete, water or any other heavy element or compound.

Parkes said that the problem of power reactor development and its application to aircraft propulsion is capable of solution within the coming framework of nuclear technology. Guided missiles or missiles aerially powered by nuclear reactors would not need shielding, but there would be a new problem of launching or landing such vehicles in protected areas. For one-way missions, nuclear propulsion would hardly be economical, he thought.

Thermal Cycle-Parkes favors the turbojet or turbojet application of nuclear power, in which the reactor is the heat engine element for an engine or burner through a duct and cooled through an exhaust nozzle. He said that this would be the only practical way to apply the heat engine thoroughly. The use of a turbo-propulsion unit to drive a turbo-jet combination was highly impractical, he thought.

Parkes said that even though the application of the reactor as a heat transfer device seems to be the only feasible method at present, it suffers from severe metallurgical problems. This comes from combination of heat transfer, where the surface of the reactor must be at a higher temperature than the air or gas flowing through it.

Then the working temperature of the reactor is a design limitation. Metals chosen for it must be capable of withstanding high temperatures and extreme oxidation densities in addition to having physical properties which would not interfere with nuclear production on site for the reactor.

According to Parkes, nuclear-powered aircraft would be very large and conservatively slow, but would have to be designed for extreme reliability and maneuverability. Any possible crash or failure of such an aircraft would result in very severe radiation hazards, especially in inhabited areas.

Stations—Thompson—Stations governments using a nuclear reactor for the production of electrical power could be designed more conservatively than those for aircraft or submarines and Parkes' National concern could be avoided in a stationary setting which would also have thermal shielding and radioactive elements (which control rate of reaction). This would contrast with the outside protection for aircraft or submarine reactors which would have to be composed of large proportions of neutron 235 or plutonium.

Parkes and that liquid sodium



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Thompson retreads are providing more landings per used and more tread per casing. They are reducing maintenance costs and, above all, are safe. Their superiority is the result of precision workmanship, specially designed equipment and the advanced techniques Thompson has developed in the years of producing quality retreads for all aircraft.

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would be the best transfer medium in a closed cycle for the stationary prototype, the metal has been proven to be the best coolant and heat transfer agent available which will not disturb the intricate processes within the plant.

►Chicago Power-Plant protection unit with the nuclear reactor was estimated at 7.9 mil. per kilowatt, which compares to a quoted figure of 7.42 mil. per kilowatt for existing conventional steam power generating plants.

But while further development in power plant equipment is probably limited, and Peake, nuclear power plants are at the beginning of their development life and will definitely become more economical in time.

North America's small reactor could be used for mobile or small generating stations especially suited to the needs of the Corps of Engineers in remote areas such as the Arctic or the Pacific Islands.

Government control and inhibition will be required for a long time to come; if nuclear weapons are still a necessity for the country, stationary reactors could be designed to produce plutonium as a byproduct for sale to the government. In this way, a vehicle could be established much as present petrol refineries have to support the commercial airlines, Peake said.

Plutonium would not be a byproduct of second reactors, such a reactor would probably be a user of plutonium in itself, Peake added.

►New Era-Peake said that during the next five years, development would be laid for the practical application of nuclear energy for power production, isotope and radioactive tracer production and nuclear-propelled aircraft flight. He said that nuclear-powered rocket propulsion was not technically feasible within the next few years, primarily because of the enormous mass ratios which would result from the heavy shielding necessary.

Even an unmanned nuclear-reactor propelled orbital vehicle is not likely because the required nuclear reactors would be much heavier than those required for aircraft reactors, and would still be a limitation even if a feasible mass ratio could be obtained. No actual work in existence or envisioned could survive the rigorous conditions required for a rocket reactor.

French Improving Djinn Jet Copter

A new rotor and more powerful gas turbine propeller, are among the modifications being incorporated in the new French Djinn helicopter to improve its performance. Since, its maker, reports several removal of the rotor, a prototype of which was discussed recently to French officials

(Aviation Week, Nov. 25, p. 40), no plans.

The Djinn's new rotor will have a diameter of approximately 24 ft. The improved rotor's gross weight will be 1,500 lb., maximum speed will be 75 mph., maximum cruise speed will be 57 mph., and service ceiling 18,000 ft., the maker estimates.

Three models of the Djinn are in the works.

- Single-place, having a range of 110 mi. and 151½ hr. useful load.
- Two-place, with range of 84 mi.
- Three-place, fitted with two turboshafts and having a range of 47.93 mi.

Since, one of the subsidiaries French aircraft plants, is interested in developing the Djinn for commercial purposes, and has placed Mr. Benoit, managing director of Helicopteur, in charge of plans to promote sales of the copter in France and its possessions as well as other European countries.

Navy Contracts

Contracts recently awarded by the Navy's Aviation Supply Office, 7000 Ralston Ave., Philadelphia 15, are:

Adair Inc., General Motors Corp., 10771 Van Over St., Detroit 4242 hydraulic pump for engine support systems for A-1H; Air Research, Inc., 400 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H; Air Research, Inc., 400 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H; Air Research, Inc., 400 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H.

William Reed and Co., Inc., 1000 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H; William Reed and Co., Inc., 1000 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H; William Reed and Co., Inc., 1000 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H.

Boeing Aircraft Co., 1000 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H; Boeing Aircraft Co., 1000 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H; Boeing Aircraft Co., 1000 W. 42nd St., New York 36, 10011 hydraulic pump for engine support systems for A-1H.

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CONTINENTAL
A-40

Gas Turbines by a Power Pioneer

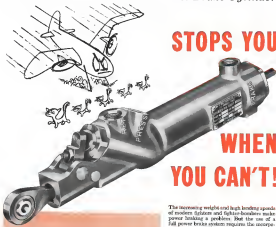
Continental has sparked aviation progress down through the years. Today, its outstanding family of gas turbines lifts fuel to civil and Continental's most noteworthy contribution of the past—the introduction of the A-40 engine which launched private flying as its one of greatest growth. . . . Opening of the second half-century of flight fuels the broad engineering and production experience of the 25-year-old Continental family focused on turbines. Augmenting this is the specialized knowledge of a steadily-growing staff of leading technicians in this field. . . . Manufacture is strictly under way. Your requirements—conventional or otherwise—for shaft turbines, air generators or turbo-jets can be met by C.A.E.

Engineers and others desiring courses in the field of small turbines are invited to visit, at long background and type of work desired.

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New Whittaker Power Boost Master Brake Cylinder



A power boosted master cylinder, combining the ease of power braking and the dependability of a master cylinder. Results... "two-system" safety in one unit.

The increasing weight and high loading loads of modern airplanes and light-turbopropellers make power braking a problem. But the use of a full power brake system requires the incorporation of an auxiliary emergency system. The additional brake valves, accumulators, master-valve, means of pressurization and master in addition that such systems in fact, add up to a considerable weight penalty.

The Whittaker power boosted master cylinder combines two independent systems in one unit, giving the pilot power brakes and emergency brakes as a weight increase only slightly over that of a master cylinder alone. In the event of hydraulic loss or failure, a pilot's instant reaction is to increase the pedal pressure and this act alone gives the emergency unit in operation. He stops!

Model illustrated above is 2 1/2" actual size. Height is 2 3/8" and represents a typical application and one is modified to secure required pressure and volume needs. Add to this demonstration the operation and advantages. Write today for Design Literature No. 113.

Whittaker

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SURFACE BARRIER TRANSISTOR can operate at higher frequencies, low powers.



TWIN JET ink jet in germanium pellet, having .0002-in. thick barrier.



ETCHING AND JUNCTION FORMING on germanium pellet, using etching jet.

New Transistor Easy to Mass Produce

By Philip Klaus

Philadelphia—Experimental quantities of the basically new "surface barrier" germanium transistor recently announced by Philco Corp., should be available to the industry for military applications with a "few months," a company spokesman says. The firm is currently offering up for pilot production of the new device, which can operate at much higher frequencies, even very low power, and is well suited to mass production (AVIATION WEEK Dec. 21, p. 7).

Philco says the surface barrier transistor has much better performance than previous trade (three-element) junction transistors. Performance is comparable to point-contact and intrinsically (four-element) junction transistors, but the new surface barrier type is easier to produce.

► **New Transistor Advantages**—Philco claims the following advantages for the new transistor:

► **Higher Frequency Operation**. New units will operate beyond 50 mc (have been tested beyond 100 mc), frequencies heretofore possible only with point contact and intrinsically transistors.

► **Higher Gain-Bandwidth**. Surface barrier transistors have a gain-bandwidth product (figure of merit) 50 times larger than junction transistors made by the conventional alloy process techniques.

► **Lower Power Consumption**. New unit achieves dc higher frequency operation with a power consumption only 1/10 to 1/25 as great as point-contact and intrinsically transistors. Philco says its important advantage for avionic use: Collector operating voltage need be only a 1/2 to 1/3 as large.

► **Easy to Mass Produce**. Other manufacturing processes employ essentially laborious type techniques, limiting quantity and quality of transistor output. New process appears well suited to mass production.

Comparison of transistor noise is difficult since Philco's figures for the new transistor were measured at 10 mc, a higher frequency than some measurements cited for other types. Transistor noise is usually inversely proportional to frequency.

► **Good Reliability**—Despite these impressive performance figures, Philco insists any they have not overlooked the surface of the transistor's capabilities. They believe the new process opens up other new areas for exploration. For example, the process makes it possible to construct complex multi-transistor circuits which are substantially immune to physical environmental conditions. This should be a great boon to digital type computers and communication systems in aircraft, where very large numbers of semiconductor elements are required.

The new process is called "one of the most important scientific discoveries in solid-state physics," by David B. Smith, Philco vice president in charge of research. He refers to an Avianon Week story, a qualified scientist's opinion in transistor research by research laboratory more cautiously termed it "a subtle technological advance."

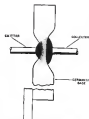
Navy Bureau of Ships, which sponsors a portion of the Philco research program, looked about one-third of the lot, Philco's first.

► **The Unusual**—The surface barrier technique was developed long ago, but it was not until the late 1940s that the Philadelphia Institute and the Philadelphia section of the Institute of Radio Engineers, a large and impressive list of semiconductor experts from most of the major transistor and electronics line attended at Philco's institute.

Notion wide disclosure of the surface barrier transistor followed shortly after the Philadelphia meeting with the publication of five papers, by Philco scientists, in the December issue of the Proceedings of the IRE.

► **Old vs. New**—Several techniques are used to manufacture the basic element of the junction transistor, including the alloy process and the diffusion process. The alloy process is the most widely used. Two small beads of molten, which become the emitter and collector elements of the transistor, are fused to a very germanium base pellet. Then, by a carefully controlled heat treatment, the molten beads are caused to diffuse into the germanium pellet. The problem is to control the penetration of the molten so that only a very thin layer (of order thickness) of "pure" germanium remains.

A simple analogy, which illustrates the difficulty of controlling the alloy or diffusion process, is to alternately dip the end of a bag of sugar into a cup of coffee, trying to maintain a thin bridge of white sugar (germanium) between the two colored (indium-germanium) ends. Inasmuch as the actual diffusion depth cannot be checked by visual means, to make the



GIBBY METHOD for making transistors requires close control over depth of contact-molten bead diffusion into germanium.

sugar being deposited more representative, it should be performed blindfolded.

Other processes used to make point transistors are considerably difficult and demanding in the precision of their control.

► **Two Innovations**—Philco has introduced two major innovations, the second, originally developed as an outgrowth of the first, is probably more noteworthy in its significance.

► **Field Jet Etch**. Two fine streams of etching solution (sulfuric acid solution) approximately 0.0010-0.004 in. dia., are simultaneously directed against opposite sides of a type N germanium pellet (approximately 0.01 to 0.10 in. in diameter). A potential of several hundred volts between the jets and the pellet, held in a heat direction (germanium being in the positive electrode) etches small jets on either side of the pellet (see sketch, right). Etching continues until a thin bridge of germanium (base) approximately 0.0002 in. thickness remains.

► **No Contamination**. The "intrinsic device" produced by etching is washed away by jet etching stream, continuously keeping germanium surface free of contaminants and control and not being contaminated by the etching process. Philco says it can control the thickness of this barrier to within 0.0001 in., by employing nature.

► **Electroplated Junctions**. When the pellets of the voltage applied between the germanium and the jet stream is reversed, metal ions are deposited electroplated in the small etched pits. Philco discovered that by using certain types of metallic salt solutions, such as sodium sulphate, the deposited metal beads form a "rectifier type" contact with the germanium, giving good transistor action. One of the beads serves as the emitter, the other as the collector.

In little more than two months after the small germanium pellet is placed in the etching machine, the transistor is completely formed, except for a surface clean-up step to remove oxidation

amount which might otherwise give a low output impedance. All that remains is to attach leads, mount the element on a base, and hermetically seal it.

► **Why the Name?**—"Surface barrier transistor" is so named because the transistor action takes place at the surface of the germanium crystal rather than inside. The base (ways to etch planar surface barrier transistor action has not yet been completely developed. This is not unusual in the new field of semiconductor where, in one observer put it, "there are many conflicting theories, too little known understand."

When Philco let open the electroplated junction forming technique, some of its theoretical physicists did not think it would produce a rectifier type junction, according to their existing theory, a representative of the firm confessed to Avianon Week. After it was demonstrated that the technique did produce good transistor action, and could be repeated with surface results, the theorists tended to skepticism and admit their basic theories, he added.

► **Process Advantages**—From a manufacturing viewpoint, these are several major advantages to Philco's process:

► **Precise Dimensions**. The ability to control the thickness of the germanium barrier with great precision permits construction of very thin barriers. This is directly responsible for transistor's low voltage operation and very high frequency response since the transit time for "hole" effective current carrier is proportional to the square of the barrier thickness.

► **Early Control**. The entire process, including control of barrier thickness, is directly and easily controlled, simplifying design of automatic production machinery.

► **No Contamination**. The "intrinsic device" produced by etching is washed away by jet etching stream, continuously keeping germanium surface free of contaminants and control and not being contaminated by the etching process, which operates only on the top.

► **Electroplated Junctions**. When the pellets of the voltage applied between the germanium and the jet stream is reversed, metal ions are deposited electroplated in the small etched pits. Philco discovered that by using certain types of metallic salt solutions, such as sodium sulphate, the deposited metal beads form a "rectifier type" contact with the germanium, giving good transistor action. One of the beads serves as the emitter, the other as the collector.

In another paper, the J. B. Angell reported that one of the new transistors provided 12 db gain when used as a signal amplifier at 55 mc in a randomized noise spectrum with three volts on the collector. The carrier had 20 db gain at 30 mc. Dr. Angell said he also described using one of the new transistors as a mixer. With a 30 mc signal impressed on the collector, and the local oscillator signal applied to the emitter,

Rescue Beacon

To show off its low power consumption of its new development, Philco demonstrated a tiny six-pin tube, containing a surface-barrier transistor oscillator, which gets all its power for continuous operation from a battery cell operated by its built-in water. The oscillator also showed a new transistorized VHF receiver for military use which can operate six hours a day, for one month, on one pair of ordinary flashlight batteries.

layer of atoms is good on the emitter and pellet, prevents damage to its all important non-oxidizable structure.

The technique can be used with a variety of different materials in addition to silicon, including tin, zinc, cadmium, and platinum, Philco says. Some of these materials, like tin, are not presently used in other types of junction transistor processes.

The company learned only in its experiments that the subject light around the etching machine which etching rate because germanium is photosensitive, that other elements be controlled. By making the collector jet slightly larger than the emitter, higher amplification factors (alpha) are obtained.

► **Typical Transistor Characteristics**—In one of three papers presented at Philadelphia, W. E. Bentley, technical director of Philco research, described the performance characteristics of a random noise spectrum amplifier with one transistor. [Collector operated at 5 v., collector current of 0.5 ma.]

► **Range of**

Parameter	Typical Value	Range Tested
Alpha	0.9	0.6 to 0.95
Gain-Cutoff Freq.	55 mc	25 to 60 mc
Collector Bias (V)	100,000	150,000 to 1,000,000
Collector Current (ma)	0.5	0.1 to 1.0
Emitter Bias (V)	400,000	5 to 55,000
Base Bias (V)	400,000	5 to 55,000

Base Bias (V) 400,000 5 to 55,000

Base Bias (V) 400,000 5 to 55,000

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the seat produced an r.f. signal with 12 db gain, he said. Angel also reported using the device in a turbine fly stop circuit which exhibited a 30% improvement rate time.

► **Status**—12 surface barrier units produced to date (number undelivered), but estimated at around 1,000 were made in the laboratory. This limited output was due from inadequate to more demand even within the company, a spokesman said. In addition to its own production plant, Phoca is presently considering a plant whereby it would license other manufacturers to use its surface barrier methods.

The company faces no problem in

making the transition from lab to production because of the basic nature of the process. Compared to conventional treatments which Phoca has been producing, Smith says the uniformity of surface barrier treatments is "an order of magnitude [less time] better."

► **Heatshrinkable Solid**—To assure long life, the transistor circuit is being mounted in a heatshrinkable solid resin, approximately 1 in. dia. 1 in. long. The case is filled with a heat-conducting compound to keep the unit adequately protected from the metal case. Fuses, too, are being used to protect the transistor in the electronic chains, will also serve to transfer heat.

Tiny Devices to Cut Avionics Load

Several recently announced substitutes completely may help reduce equipment clutter in these continuous cluttered cockpits in the future.

► **Sealed Rider**, weighing only 3.5 oz. and having a volume of 1.5 cu. in., is available in an pole, double throw configuration for operation from 100 to 400 Hz. The new Type 34 is designed to meet MIL-R-3927 A and B, will operate at temperatures of -65 to 150°C. Contact rating is 2 amp. (positive) and coil resistance is 325 ohms. (Alvins Switch & Signal devices, Waukegan, Ill. 60085, Dept. 63, 17390/1507 Road-Ave. E., Franklin 18, Ill.)

► **Sub-Mic Amplifier**, for use with piezoelectric, capacitive, or strain gage type pick-offs in telemonitoring or recording circuits, uses ruggedized type 9A tubes. New Model 2087 amplifier was initially designed by Endevco Corp. for use with its tiny Series 2183 accelerometer pickups. Amplifier has an input impedance of 150 megohms, selectable gain rate of 10, 30, or 100 and a high gain stability of 3% under varying supply and ambient conditions, manufacturer says. (Endevco Corp., 658 South First Oaks Ave., Pasadena, 2, Calif.)

► **Low-Torque Potentiometer**, 6.675 in. dia. operates with a mechanical force as low as 0.015 in. oz. and is available in single or ganged units, according to Electro-Mac Laboratory, its manufacturer. New Type 9 pots are available in resistances of 50 to 150,000 ohms with standard tolerance of 0.5%, or 0.25% if required. Short circuiting up to 300 μ A and a variety of tapered connections are possible. (Electro-Mac Lab.,

2149 41st Ave., Long Island City, N. Y.)

► **Resistor-Capacitor Networks**, made by Synapse Electronic Co., are now available with design-type terminals previously noted for availability on printed circuit type assemblies and depaneling techniques. Various types of integrative, delay filter, de-emphasis output, and coupling networks are available. (Synapse Electronic Co., North Adams, Mass.)

FILTER CENTER

► **AA Min Try Select**—American Airlines is considering the purchase of one or two prototype Select units which Motorola is building to enable other airlines to try out the new select line calling system. (Aviation Week Nov. 16, p. 71) AA's interest stems from the fact that with new remote control VHF stations used by some Air Route Traffic Control Centers is in late speed some time monitoring VHF service, making it more difficult for companies to get the crew on its HF channel.

► **NBS Microwave Plans**—National Property Standards group of the National Bureau of Standards will soon be instrumental in operation of frequencies of 300 to 75,000 mc, and has letters patent to 100,000 mc and higher.

► **Radio Proof Standards**—Newly established standards for radio circuit radio parts, and the output circuit, in which they are installed, are contained in new SC-46 report available from Radio Technical Commission for Aeronautics, 1724 "F" St., N.W., Washington 25, D. C.

► **Narco Demonstrates DME**—National Aeronautics Corp. is making a series of demonstrations flights to show off its new DME (distance measuring equipment) to airline operators, business plane operators, and distribution. Narco says it expects to begin delivery on production model DME in January and weighs 25 lb., fits on a 4 ATR case, and is priced at \$4,990.

► **Dockson Opens West Coast Office**—Dockson Corp. of Boston, which makes gyroscopes and control equipment, has opened a West Coast office at 334 Topp Plaza, Palo Verde, Calif., with George S. Fern as manager.

► **Reon-Woodbridge Corp.**—Address of recently formed Reon-Woodbridge Corp., located by two former Hughes Aircraft Co. vice presidents, is 6316 W. 72nd St., Los Angeles 45, Calif. —P.S.

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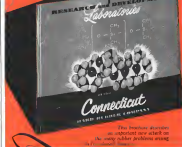
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Omni Aid

New Omnicontrol, developed by EneGel division of Lear, Inc., for emergency braking, combines lightweight structure, resistance to shock, and VDR means selection in a single unit. Instrument, Omnicontrol, now in production, will operate from Lear LTR-6 VDR master/transmitter. Lear says it will continue to build precision safety-critical type of emergency gear.

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EQUIPMENT

X-3 Cooling System Small but Powerful

By George L. Christian

Berlows, N. Y.—The cooking system now being in Douglas' N.3 high-speed research plane represents a completely new, high-efficiency method developed by the Stratos Division of Fairchild Engine & Airplane Corp.

Stratex has incorporated an evaporative heat exchanger with the more conventional air-cycle refrigeration system and distorts heat exchangers to achieve maximum capacity cooling in the smallest space and with the lightest equipment possible.

In everyday terms, this system has the power to cool 24 four-room houses on a 100-deg day, Shurtas says. Yet the weight of its eight compressors is only about 110 lb.

► **Highest Requirement**—The X-3 got such high-capacity, compact cooling equipment because it was the first manned aircraft conceived and flown in the U.S. whose design requirements called for sustained flight at high Mach numbers—the 3.3's come.

Although the Douglas Skyrocket is known to have flown at least at Mach 2.81, the rocket light-bow launching at 12,000 ft to making the speed run at 65,000 ft to dead-stick landing—lasted only some 12 minutes, eight of which were used for the glide home. So refrigeration problems in the Skyrocket were not expected to be nearly as serious as in the N-3.

• **System Operation—Status:** evaporative refrigeration system, labeled the EAL80, has the highest heat rejection of any airborne air conditioning system in existence, according to the manufacturer.

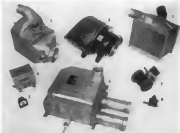
Dale Moeller, Stetco's chief engineer, is given credit for the system's conception, and directed design and development.

How is how the EA180 operates? Air, heated by compression, is bled from the turboshaft engine's compressor, in conventional manner. Air is passed through a ram air heat exchanger, then through a blower heat exchanger.

But, the ambient air would be so hot due to one rise in design speed of the N3, that the temperature drop, even with an efficient electric evaporative turbine, would be insufficient to cool the aircraft effectively, Shuster says. That is the reason for adding the evaporative cooling unit, as "booles." From the booles, air is spun through the air-circulating turbine, and from there blows into the cockpit.



X-IPS HPC/HI-MACH design speed led to requirement for high-capacity cooling rails



STRATUS EABO COMPONENTS: 1) Motor heat exchanger, 2) air-side cooling; 3) non-heat exchanger, 4) tachometer amplifier, 5) tachometer indicator, 6) evaporator, 7) governor control valve, 8) governor control regulator.

In the evaporative cooling, or least evaporation, water is leaked away at ten percent continuously below 323F, the place of the absorber at which the ice is flying. Being an open-cycle device, the water is not recycled. The Special Heating Management keeps water from being absorbed away with the steam. The high efficiency of the system makes it practical to carry the water to the absorber, where the water is pumped to make the water cycle. Station engineers claim:

- **More Than the Cogit-A-1** performs passed by the X-5's high design speeds in the comfortable air temperature rise that it does. At Mach 11, for example, the temperature rise is approximately 323F. At Mach 25, the temperature climbs to about 480F, and at Mach 33 it reaches 9,000F.
- **In the range of the X-5's design speeds**, the air cockpit never cools. The 1,200 lb of water in the cockpit

4000 ft. Static engineers claim.

► **More Than the Cockpit**—A problem posed by the X-5's high design speeds is the comfortable air temperature rise due to ram. At Mach 2, for example, -67°F air will heat to approximately 320°F. At Mach 2.5, temperature climbs to about 486°F, and at Mach 3 it reaches 9,000°F.

So, in the temps of the X-75 design speed, more than the rocket needs cooking. The \$100 B of research and

positive valve operation

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tight shut-off
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long life
handles all liquids and gases



General Catalog: AFI-1 Seven Shut-off Valves control pressurized liquids and gases under extreme vibrations and acceleration conditions. Compact and light weight, these multiphase Hg valves come normally open or normally closed, with either axial or symetric seats. Completely sealed-off continuous duty rods allow prolonged energization, with extremely low leakage rates. AFI-1 valves are available in three sizes for positive shut-off under nonvacuum conditions up to 1500. Special units are available for duty up to 3000. The AFI-1F features a plunger type membrane and soft seat, handling virtually all gases and liquids from -60°F to 160°F. The General Catalogs Hg family also includes axial and symetric valves for use in vacuum applications. For more information write for a copy of Catalog 350.

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NEW AVIATION PRODUCTS



Gang Channel Nuts Speed External Tank Assembly

Elagic Strip Nuts in gang channels reportedly reduce time and labor requirements for production and assembly of the Boeing B-70's external tank tasks—believed to be the largest that are built. Units are manufactured by Elastic Strip Nut Corp. of Norcross, Ga. (a subsidiary of Ryan Aeronautical Co.).

Extensive use is made of gang nut channels where assembly point location is such as to make it impossible for a worker to hold the nuts while bolts are driven up to make the joint.

With the B-47 fuel tank, use of nuts prepositioned in channels helped to cut down on the cost of the tank because they are automatically positioned when channel is attached, Elagic says.

The tanks are constructed in three basic sections. To facilitate shipping and storage, the two tapered end sections can be removed, stored and stored in cylindrical storage sections. Joint fingers are made for tank. Each gang nut channel holds one nut and is stamped in some quantity of Elagic configurations—the joint is made with 36 nuts and bolts.

Manufacturer states that regardless of vibration and dynamic loadings in flight, nuts held in place by the prepositioned and structural factors. Tanks are designed to use Elagic Type J channels and Type NRGL nuts. Channels are constructed of high-strength, anodized 2024-T3 aluminum, have grid nuts with nylon inserts to protect against attack from fuel.

In operation, bolt and nut are drawn together. Bolt threads engage themselves in nylon collar, which is smaller in diameter than bolt thread. Pressure caused by increased nylon forces and holds bolt and nut threads into metal-to-

result of diversification

Lockheed in California increases engineering staff

(Diversification of Lockheed is resulting in more and better careers for engineers.)

Already 12 models of aircraft are in production—huge luxury liners, cargo transports, jet fighters and bombers, bombers and radar search planes. Already Lockheed's development program is the most diversified in company history.

Now Lockheed is increasing its engineering staff to keep pace with these developments in its expanding long-range program:

- 1. new missile division**—Lockheed has established a new division to deal exclusively in design, development and production of perfect aircraft and their electronic systems. The new division has been organized to meet the accelerating pace of automatic flight.
- 2. nuclear energy**—Lockheed has announced a contract to study nuclear energy applications to aircraft.
- 3. advanced fighter**—Lockheed has received a development contract for the highly advanced XF-104 day-to-day fighter.
- 4. new super constellations orders**—New orders for the Super Constellation have increased Lockheed's backlog. Immediately Lockheed now has 58 airplanes throughout the world in Super Constellation customers.
- 5. jet transport**—Lockheed is continuing design work on jet transports. Other classified development projects are in progress.

Why Lockheed offers better careers for engineers:

These developments of Lockheed are important to career-conscious engineers.

They mean more career potential are opening up.

They mean you have more scope for your ability.

They mean there is more opportunity for promotion with so many projects in motion.

They mean your future is not limited to any particular type of plane because Lockheed is known for leadership in virtually all fields of aircraft.

They help explain why Lockheed has an unequalled record of production stability year after year.

Immediate openings for:

aerodynamics engineers
aerodynamics "A" and "B"
j. engineers the aerodynamics world
thermodynamics engineers
thermodynamics "A" and "B"
j. engineers the thermodynamics world

In addition, Lockheed's broadest of expansion projects has central immediate openings for:
design engineers "A" and "B"
flight test engineers
j. engineers—mechanics "A" and "B"
process control engineers
stress—mechanics engineers
structural engineers

design specialists
we in the field of aerodynamics can come to design flight control and guidance systems for guided missiles.

research engineers
with experience in dynamics and mechanical systems
Lockheed is looking for research in structural dynamics.

research specialists
with minimum experience in rocket motor analysis and development.

General level vacancies

Lockheed invites qualified engineers in reply for their resumes. Please include your experience.

Mr. E. W. DeLoach,
Engineering Council, Dept. A-1
Lockheed • P.O. BOX 108
Burbank, California
Dear Sir: Please send me an application form and detailed brochure describing the work at Lockheed in California.

My name
My field of engineering
My stated address
My city and state

Lockheed

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Features complete sealing from effects of water, dirt and oils • Vibration resistant up to 240 g's • No resonance up to 7000 C.P.S. • Will take 20000 P. lbs. shock test • Rated 10 amperes resistive 28 V. D.C. or 115 A.C. • Actuators made to fit individual requirements • Silicone, neoprene or vinyl molded cases • Wire leads from 6 inches to 48 inches optional

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COMBUSTION CHAMBER cleaner at work on 3400 (25) engine.

Engine Chamber Cleaner Stretches Overhaul Period

New combustion chamber cleaner is used to provide quick and effective cleaning of combustion chambers of aircraft engines without disassembly.

Operated by an operator, the new engine service equipment "blasts" a special hardened cleaning agent into the closed cylinder through an adjustable nozzle attached to one of the spark plug ports. Resistant action within the combustion chamber loosens the carbon and other foreign deposits. Waste materials and deposits are blown out of the cylinder through an adapter attached to the other spark plug port and is returned to a disposable bag. As little as five minutes of cleaning time per cylinder is required.

Reduction of combustion efficiency and reduction of maintenance costs have been demonstrated in use of the machine by several manufacturers and operators, the maker says. The frequent cleaning of the combustion chamber permitted by the device—over 50 to 100 times—is recommended for high-altitude—its said to allow lengthen any time between major overhauls as much as 50%.

Cleaning materials used are not abrasive or corrosive, and leave no harmful residue in the engine.

Developed and manufactured by Kent-Moore Organization, Inc., Detroit, the cleaner is an outgrowth of a machine embodying the same principle which has been used by the automotive industry for several years. It is patented by Rice-Prunien Sales Inc., Palo Alto, Calif.

A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

No Room for Industrial Complacency

Do you believe that American industry is equipped with remarkably up-to-date and efficient machinery? If you do, you are mistaken. The fact is that a large share of American industry's equipment is ancient, of obsolete design and incapable of attaining the efficiency that is made possible by modern production techniques.

This fact is documented by the Seventh Inventory of Metalworking Equipment, just completed by AMERICAN MACHINERY, a McGraw-Hill publication. In brief, AMERICAN MACHINERY shows that:

1 More than half (58%) of American industry's most basic production equipment—machine tools and metal-forming units—is average, and much of it is so old that it has very limited usefulness.

2 Since Korea, the situation has become dangerously worse.

Facts vs. Plausible Theory

These conclusions contradict the widely-held

impression that America's industrial equipment is in better physical shape than ever before. The prevalence of this impression is not surprising. We, as a nation, have spent about \$125 billion for new industrial plant and equipment since World War II. That is more than in any previous period in our history. During 1953, American industry invested \$21 billion in new plant and equipment, an all-time high. From this, it would be reasonable to infer that our industrial plant and equipment must be in fine condition.

But the facts do not support that inference with respect to the machine tools and other metalworking equipment that are so crucial to the economy in war and peace. Here are the key findings of the AMERICAN MACHINERY Inventory:

(1) More than one million machine tools—out of a total of less than two million in the metalworking industries—are at least ten years old. Many of these, after day and night operation

during the war years and the recent rush to rearm, are actually much older production-wise than their age in years indicates. In most cases, these machines are unable to produce goods as efficiently as modern equipment can, thus needlessly increasing costs.

(2) Almost one out of five machine tools is more than twenty years old. Most of these machines are so outdated by modern standards that they have little more than scrap value. And an even larger portion of our metal-forming equipment (presses, brakes and shears, bending and straightening machines) has passed the 20-year mark and is beyond normal retirement age.

(3) Two out of three machine tools are of designs predating World War II, though many of them have been built since the war. Thus, two-thirds of our machine tools fail to incorporate the many major postwar improvements in design and operating methods.

(4) Never before has outmoded high-cost equipment been so widely diffused throughout American industry. In every one of fifteen major divisions of metalworking production, more than 45% of the machine tools are at least ten years old.

(5) Not since the depression days of the 1930's has the average age of machine tools risen so rapidly as it has in the past four years. Today, 55% are ten years old or older, compared with 43% just before Korea.

Quality vs. Quantity

Why has the condition of our metalworking equipment been steadily deteriorating since the end of World War II? Part of the explanation lies in the fact that, in the immediate postwar years, production of metalworking equipment lagged behind the production of industrial equipment generally. The larger part of the explanation, however, lies in the tremendous postwar expansion of the American economy. This expansion, which has more than doubled our total industrial capacity, has imposed requirements for metalworking machinery that have been met only by more extensive use of old and obsolete tools. In the critically important field of metalworking, the job of providing up-to-date tools is larger than it ever has been.

There are those who argue that the time has come to cut back investment in new industrial plant and equipment and divert more of the national income into current consumption. They cite both the great increase in the nation's total industrial capacity since World War II and the fact that some industries now have more than ample producing capacity to meet their needs. But this type of calculation leaves out the efficiency of that producing capacity.

The AMERICAN MACHINIST Inventory makes it manifest that in the key field of metalworking we are alarmingly short of first-rate, low-cost producing capacity. If we fail to remedy this situation by speeding the replacement of obsolete tools, it will be at the peril of our prosperity, at the peril of a sustained increase in our standard of living and of our national security.

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This SIMPLICITY OF DESIGN is important for these reasons:

- ▶ reliability—less chance of pump malfunction
- ▶ less maintenance
- ▶ less cost for overhaul
- ▶ less weight . . . less noise

Add Pesco Simplicity of Design to Pesco's exclusive, patented "Pressure Loading" principle, which results in volumetric efficiencies up to 97% and torque efficiencies up to 90%, and you have two important reasons why so many industrial and aircraft manufacturers have standardized on Pesco pumps.



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AIRCRAFT PRODUCTS DIVISION

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CAB Rejects Interchange Plan

**Reversal of stand on Florida-Texas-West Coast route
proposal leaves another avenue open to similar goal.**

The Civil Aeronautics Board majority has denied an interchange proposal it originated two years ago to establish competitive southern transcontinental routes.

The Board turned down a voluntary Florida-Texas-West Coast flight as an arrangement of Eastern Air Lines, Braniff Airways and Trans World Airlines. The interchange would have competed with the existing National-Delta-CGS-Continental-American service.

Legal hurdles—Although the legal validity of proof in such cases is on CAB to show the proposal is contrary to public interest, the Board majority this time shifted the burden of proof to the carriers on grounds that Eastern requires a new franchise to link its Texas and Houston transcontinental service.

CAB left the record open for 60 days for TWA to negotiate an interchange with National in New Orleans to accomplish "about" the same competitive southern transcontinental service as proposed, but without technically requiring new state authorization for Eastern across the Gulf.

CAB members John Lee and Joseph Adams dissented. Adams said the factors that prompted the Board's favorable decision Feb. 11, 1952, on the same service had been strengthened since that decision, which was spent in the courts on a matter of due process of law in the procedural steps leading to the valid ruling.

Adams said Braniff had lost substantial revenue to the National-Delta-Continental-American interchange service and may be forced back on subsidy when the Board strengthens its system by granting such proposals as the new service desired.

Majority dissenting—Key vote was that of member Chan Gurnee, who favored the competitive interchange two years ago. The new majority opinion reversed.

Eastern would lose \$101,000 a year as its personal Braniff would lose "over \$56,820 and TWA would lose only \$15,680 a year, and the record now shows that the proposed interchange could not obtain for itself sufficient traffic to meet the expenses of over one daily round-trip from West Coast to Miami."

Denial interchange service of the existing carrier group provides "a measure of flow daily through services and

these services offer substantially similar arrival and departure times."

• **Deviation from other routes** "would result in excess of \$2 million by the applicant over existing and would thus \$4 million by (CAB) means carrier's estimate."

Continued, the interrelated parties in the existing interchange, "would affect the carrier's ability to maintain a million dollars annually... prior thus doubling the carrier's dependence upon subsidy mail pay."

• **Cost** American Act "imposes upon the duty to consider as being in the public interest 'competitiveness to the extent necessary,' but also 'regards as to shorter and economic conditions.'"

CAB does not "entirely competitive competition for competition may be adopted."

The Board majority concludes

Mail Rates Cut

- Board gives in to P. O. pressure for lower pay.
- Six lines reduced to 45 cents on rural routes.

Civil Aeronautics Board has given in to Post Office Department pressure by slashing the mail rates of two trunk lines and redefining the rates of four others.

The six affected airlines flew mail at 45 cents a pound, competing with the Post Office at 45 cents. Post Office recently announced that on Jan. 1 it would fly mail at the lowest competitive rate rate, whatever the differential cost on major domestic trunk routes.

Meanwhile, CAB also announced it would study the carrier mail-rate situation in light of the impact of the rate reduction.

Results of the immediate rate cut suggested by CAB last week:

- National and Northwest Orient rates dropped to 45 cents a pound on all domestic routes.
- Trans World Airlines rates 1954 and American, National by \$128,000 and NWA by \$279,000, CAB estimates.

Such a move had been planned by the Board as far back as 1951. The Post Office once postponed the CAB move on these two, however. Later

growth of the Post Office first-class mail subsidy may crop revenue losses on their major routes.

• **Braniff, Capital, Delta-CGS and Western** may not lose annual revenue, CAB says, because the Board increased pay on non-competitive routes to offset losses at the 45-cent rate.

Approximate proportion of their mail volume on competitive routes: Capital, 75%; Western, 50%; Delta, 35%; and Braniff 14.5%. The shifting non-competitive amounts vary in the same proportion. New rates Capital, 77 cents; Western, 61 cents; Delta, 57 cents; and Braniff, 55.5 cents.

Rate changes proposed by CAB differ from the petitions of all the affected carriers except Delta. National and Northwest asked higher rates than those proposed. Braniff, Capital and Western actually asked a lower second rate structure.

The rate changes are in the form of slow rate cuts, opening the rates of Jan. 1 but allowing them again to rise as the industry is adjusted in kind. The general mail-rate-overhaul investigation presently started by CAB at the same time is, in effect, a study if the Board decides to overhaul the entire system at a later date as a result of the study, it must follow up with full hearings if parties object to the new proposals.

For this reason, CAB member John Lee entered a concurring opinion, saying the review should be in the form of a rate proceeding instead of investigation so the Board could act immediately upon raising its findings.

PAA Bids for Inland Air Travel Market

Two American World Airways hopes to compete more actively for the U.S. interior air travel market when the carrier inaugurates direct service from Chicago and Detroit to Miami Jan. 30 (Aviation Week Dec. 28, p. 7).

PAA has held a franchise on the route since 1945, but a company spokesman says the airline has not specified it is the post because of finances of the market.

The official attributes Pan American's decision to begin weekly DCG service mainly to:

- "Market growth."
- Increased PAA capacity.
- Air France. Trans World Airlines competition.

In June, Pan American plans to add direct service to Miami as well as TWA already has domestic service through the Midwest.

U.S. Will Continue Weather Ship Support

U. S. support of North Atlantic weather and ocean ships will continue next year, but "on a modified basis." As Coordinating Committee has decided to furnish weather and other data pulled out only as the U. S. previously indicated a world (Associated Press Nov. 3, p. 13).

In a letter to International Civil Aviation Organization, Zurich, Switzerland, U. S. representatives on the ICAO council wrote: "No government has decided to send a delegation to the fourth Atlantic Ocean weather conference in Paris." The meeting is scheduled for next month.

The previous AGC decision, Lutz points out, held that "although the program provided aid and benefit, its continued operation was not required from the point of view of U. S. civil aviation."

"Since that time," he notes ICAO, "the U. S. has acted with interest in the view of other governments."

- Necessary: "An ocean station network should continue to exist"
- Reliable: "Such a network might be somewhat adjusted in scope and still remain useful."
- Beneficial: "Substantial benefits accrue to interests other than trans-Atlantic and western, particularly Western Europe."

New York Airports Get New Weather Aids

A \$30,760 contract for installation of the first of an end-of-season weather observation aids at Newark, New York International (Herald) and La Guardia Airports this spring has been awarded to Lightning Electric Service, Newark, N. J.

The new weather observation program is being established as a result of recommendations made in 1952 by a technical subcommittee of the National Air Transport Coordinating Committee.

Part of New York Authority and NATCA have agreed to share the cost of the Newark improvements; installation because Weather Bureau funds are not immediately available. The Weather Bureau generally bears the bill for airport weather reporting equipment.

Cost of a relocator at the New York terminal is being borne by the bureau. Finally the transmitter and receiver installations at La Guardia and Idlewild are being made available by the Bureau in connection with other airport projects conducted at these fields by the Air Navigation Development Board.

International Airline Profits, Revenue and Traffic

	1952	1953	% Change
Revenues			
Passenger	\$212,418,800	\$239,126,731	+ 12
Mail and cargo	14,422,872	20,122,800	+ 7
Cargo	20,813,650	27,746,201	+ 3
Freight	20,586,370	27,463,876	+ 3
Total operating revenue	\$247,842,562	\$286,799,611	+ 15
Total operating expense	\$204,243,374	\$212,665,165	+ 3
Operating profit	\$43,599,188	\$74,134,446	+103
Traffic volume			
Passenger	3,360,659	3,696,125	+ 12
Revenue passenger-miles	1,005,016,000	1,356,287,000	+ 12
Mail ton-miles	20,968,200	29,812,161	+ 8
Cargo ton-miles	25,877,275	35,156,285	+ 9
Freight ton-miles	2,444,919	3,218,000	+ 12
Total revenue ton-miles	588,955,928	663,473,280	+ 12

Source: Air Transport Association

Local Service Airline Profits and Revenues

	1951	1952	% Change
Revenues			
Passenger	\$79,756,684	\$12,126,047	+18
Mail and cargo	21,314,961	21,812,216	+12
Freight	\$17,344	415,240	+ 9
Freight	405,139	495,951	+15
Total operating revenue	\$101,517,928	\$14,148,705	+14
Total operating expense	41,498,128	33,418,960	+16
Operating profit	(-40,661,200)	(-19,270,255)	

Source: Air Transport Association

Flag Line Profits Lead Industry

U. S. international flag lines led the scheduled airline industry to record total operating profits in 1953. Meanwhile, domestic mainline profits slipped slightly, Air Transport Association believes, and local service carrier losses increased.

Here is the background:

- International lines saw most of their profit to final agreement with Civil Aeronautics Board on "fixed" mail and subsidy rates, including profit. Mail and subsidy pay requested for years before 1953 were on a "temporary" basis.
- Domestic trunklines now have fallen 1 to 5% short of the 1952 record, but this was partly intentional. They added more than 100 new planes for 1953 delivery to expand and improve service—knowing that heavier depreciation charges and lower load factors would require profit margins improve.
- Local service lines probably will suc-

U. S. Airline Profits

(Not operating income in millions)

	1952	1953
Trunklines	\$82.1	\$92.6
Local service	(-3.4)	(-2.1)
International	8.6	24.2
Total profit	\$87.3	\$114.7

Source: Air Transport Association
 • Excludes equipment for transportation income and expenses and for Subsidy income taxes

tare their 1953 losses less than 1952 limitation of subsidy rates with the usual 7-8% profit rates on investment.

Just as individuals last year saw subsidy profits dropped with breakdown subsidy rates below, most local service lines probably will receive 1953 profits in some later year when local subsidy rates are set by CAB.

Indicate Castings of Ductile Iron... Produced in Quantity—most jet plane builders specifications for engine support rings, 31½" in diameter. Bottom ring may have a 18.75" in a 20" in a 22" in a 24" in a 26" in a 28" in a 30" in a 32" in a 34" in a 36" in a 38" in a 40" in a 42" in a 44" in a 46" in a 48" in a 50" in a 52" in a 54" in a 56" in a 58" in a 60" in a 62" in a 64" in a 66" in a 68" in a 70" in a 72" in a 74" in a 76" in a 78" in a 80" in a 82" in a 84" in a 86" in a 88" in a 90" in a 92" in a 94" in a 96" in a 98" in a 100" in a 102" in a 104" in a 106" in a 108" in a 110" in a 112" in a 114" in a 116" in a 118" in a 120" in a 122" in a 124" in a 126" in a 128" in a 130" in a 132" in a 134" in a 136" in a 138" in a 140" in a 142" in a 144" in a 146" in a 148" in a 150" in a 152" in a 154" in a 156" in a 158" in a 160" in a 162" in a 164" in a 166" in a 168" in a 170" in a 172" in a 174" in a 176" in a 178" in a 180" in a 182" in a 184" in a 186" in a 188" in a 190" in a 192" in a 194" in a 196" in a 198" in a 200" in a 202" in a 204" in a 206" in a 208" in a 210" in a 212" in a 214" in a 216" in a 218" in a 220" 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ENGINEERS



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TAG Reveals AF Supply Routes

Air Force is evaluating proposed freight lift between engine and airframe producers, bases and depots.

Transport Air Group has studied the routes its member airlifters have gone to operate between military supply bases, consolidation ports and engine and airframe manufacturers under USAF contract (AVIATION WEEK Dec. 25, p. 18).

The retail supply plan is similar to Navy's daily transcontinental "Operation Quickstart" contracted to Flying Tiger Line.

But the TAG proposal encompasses loads that would demand a much bigger cargo operation. It would start with about 15 C-46s and Douglas DC-4s and expand by use of government-owned perfect planes, including Douglas C-119s (DC-40s).

Less inventory—TAG's initial program calls for operations between eight Air Materiel Command bases and four ports of origin.

Now, the airlift carrier proposes a secondary system operating directly between engine and airframe manufacturers and Tulsa AFB, the huge USAF maintenance and overhaul base at Okla. base city.

This latter plan would bypass the present stage of inventory accumulation at AMC supply depots.

USAF Routes—The AMC-enriched plan would require support of the preliminary TAG study. "A Civil Air Act for a Logistics System."

- McChord AFB, Tacoma, Wash., port of consolidation
- Town AFB, Fairfield, Calif., port of consolidation
- McChillan AFB, Sacramento, Calif., AMC depot
- Northrup AFB, San Bernardino, Calif., AMC depot
- Wichita AFB, Okla., unit, AMC depot
- Tinker AFB, Oklahoma City, AMC depot
- Rockwell AFB, Mobile, Ala., AMC depot
- Palm Beach International Airport, West Palm Beach, Fla., port of consolidation
- Scott AFB, Schell, Ill., AMC depot
- Wright Patterson AFB, Dayton, Ohio, AMC depot
- Glennville AFB, Middletown, Pa., AMC depot
- Windsor AFB, Chicago Falls, Minn., port of consolidation
- Manufacture Routes—The tentative engine and airframe manufacturers' proposal contemplates an aerial supply line for Navy and Air Force aircraft using Pratt & Whitney Aircraft J57 engine.

These aircraft comprise the supply chain proposed.

- P&WA J57 plants at East Hartford, Conn., and Chicago
- McDonnell Aircraft Co.'s J57 plant at St. Louis
- Rolling Airframe Co.'s J52 plant at Seattle
- Douglas Aircraft's B4D and A7D factory at Los Angeles
- North American Aviation's B-100 plant at Los Angeles
- Convair's F-104 plant at San Diego
- Tucker AFB, Oklahoma City, Okla.

Air Force Evaluation—TAG told AVIATION WEEK that early details of its route and operations study proposal of study are under study at the office of USAF Corps J. L. Riley and J. P. Doyle. Riley is chief of AMCC's Transport Division and Doyle is USAF director of transportation.

The airlift group says Air Force evaluation of supply routes may indicate a need to change the route proposed.

TAG offers to furnish a large part of the planning necessary for USAF to

operate the system.

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get maximum use of the proposed system.

Many similar air logistic proposals have been submitted to USAF by AF offices, Douglas, Convair and others.

Navy has its Quickstart Operation, but so far no comprehensive supply system has been negotiated by Air Force.

TAG Development—TAG is the association of scheduled and nonscheduled airlift operators.

Recent membership includes Eastern Airlines, Flying Tiger Line, Overseas National Airlines, Seaboard & Western Airlines, Slack Airways and Transcon Air Lines.

The members report they "have opened production over more than 100 airports in 10 states and served more than 50% of U.S. domestic air freight the last three years and 55% of the Pacific airlift volume."

Five members operate large maintenance and overhaul bases, TAG says, with separate air bases, 500,000 sq. ft. of floor space and more than 1,000 maintenance personnel.

TAG's executive vice president, L. E. Hickley, indicates the proposed operation can match the 11 operations side of the Navy/Flying Tiger operation, assuming that Air Force, like Navy, manages to maintain something on a 50% load factor on the supply operation.

The association proposes to start the AMC and consolidation port operation with 10 DC-4s and 11 C-46s on 15 flights per day, respectively.

Total daily load factor would be 714,150, TAG estimates.

CAB Limits Mail Airlift To Certified Lines

Certified airlines must carry mail on all business the Post Office Department is going there, and there is no need to grant special mail exemptions to airlift and nonscheduled lines, Civil Aeronautics Board rules.

Assistant Postmaster General Theodore John Allen had asked CAB to grant mail exemptions to certified airlines flying Tiger Line, Riddle Airlines and Slack Airways.

The cargo carrier and a number of airlines had asked the Board for temporary permits to participate in the Post Office's experimental airlift of post-freight first-class mail.

Although CAB denies any need to distinguish of special exemptions "at the time," the Board says "with respect to Slack, FTL and Riddle, we are reviewing their respective certificate applications."

It set down for hearing of an early date.

Majority Reverses—The Board says gives these airlines the demand

say new competitive mail-carrier competition.

No undue burden CAB says the inability of airlift lines to obtain mail service is no ground for granting the exemption, and the fact that the P.O. mail exemption is temporary does not make a case for a temporary exemption.

Certified interest. Certified mail carriers "have an interest in the success of the mail experiment." The Board adds that "the most possible participation in the mail experiment could so reduce the amount of mail carried by each carrier as to jeopardize the success of the experiment."

Adequate capacity. "The scheduled and unscheduled lines of the certified mail carriers are more than adequate to handle all Post Office needs."

Future questions. CAB's majority says "there is a serious question as to the future of many of the applicants to participate in the experiment."

Certified lines. The Board says applicants have not shown any intent to expand or change operations at American, United Trans World and Convair Airlines—the carriers operating the Chicago and New York-Washington first-class mail airlift.

Reopens hearing. "It would be an abuse of the Board's functions to hear an exemption to what is being in view."

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of the critical areas used by the applicants' activities."

Conner, Assistant-CAB member John Lee and Joseph Adams say "We consider it the duty of most of the applicants' services, but direct design publishing the Flying Tiger Line and Shell Airways from carrying surface mail... on the two segments over which the Post Office is conducting its present operations."

"Since the Postmaster General has requested that participation in this... equipment should not be confined to certified personnel, property and mail carriers, we feel that Shell and the Flying Tiger, who have had applications for mail certificates on file with the Board since May 1, 1952, should be allowed to participate."

Only carrier actually operating in the Board opinion is Horace Downey, who held the balance of power in this domain and is a previous ruling that CAA has the legal power to grant mail exceptions. "In the public interest" (Aeronautics News Dec. 14, p. 134).

Chairman Donald Ryan and Chairman George Conner in the Board opinion, but on grounds that CAB does not have power to grant such exceptions.

CAB ORDERS

(Dec. 15-17)

APPROVED

As Civil Transport Area... to incorporate under the laws of Idaho. Information: Air Transport Area... mail services and cargo into aircraft by... men last at their Honolulu conference.

Capital Airlines confirmed for transport for technical and field telephone... team... observed... scheduled... holiday mail experimental type of 30 cents a ton mile for local service within

GRANTED

Railroad Airlines exemption to fly "passive" commercial and limited routes" between Seattle, San Francisco, Fla., and New York.

FORWARDED

Eastern Air Lines request to serve Mexico, Ala., through Kinston Field, Ala., as to flight rights during holiday mail. Withdrawn by treaty.

Reformation completed report Aero Finance Corp., Aero Corp. Aero and E. J. Aero, Inc., the alleged... control. CAB Office of Compliance issued General following transfer of Aero's Aero wing stock to Wallace F. Farnham, and Aero's... of all connection with Aero... management.

SUSTAINED

San Antonio World Airways proposed proportional fares and other rate... between Seattle and Kansas, Alaska, pending further negotiations.

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BY THE MISSOURI-POLITICS DEPARTMENT OF ECONOMICS

How Cyclical Is Air Travel?

WHEN YOU LOOK at the way air traffic has been growing in recent years—up and up in almost a straight line—one of the befuddling questions is: What if that growth was interrupted by a drop, as is often happen to other industries? If the future volume of air traffic should turn out to be more cyclical than it has been up to now, a lot of the industry's forward planning, particularly financial planning, would have to be revised.

Business history shows that even growth industries are not completely proof against the effects of business recessions, although the growth trend helps to modulate these effects considerably. Take the chemical industry. In recent months, the demand for a good many chemicals has slumped out. Or the oil business: Petroleum economists say they can no longer just project a growth trend, as they did for years. They now allow for cyclical fluctuations. Or if you want a real surprise, look at cotton. Demand for this wonder fiber was supposed to be unlimited. But in 1953, when textiles as a general had a slump, consumption of cotton did not increase.

It seems to make this way. In the early stages, some industries grow so fast that their growth trend carries them through general business recessions. But as an industry matures, it's annual gains are less—say 5% to 10%, instead of 20% to 30%. At that point, severe general recession may hold down the growth industry to the pace for a year or so.

Should the airlines want? Probably not. Air travel still is at a relatively early growth stage. So there is nothing as light now to indicate an actual drop in traffic. As previous articles in this series have indicated, the long-term trend is up. But as judging how fast air travel will increase, it may be a good idea to allow for ups and downs in general business that can affect the growth trend for airlines.

FLUCTUATIONS IN GENERAL BUSINESS

Economists now are pretty well convinced that the American economy has become more stable than it was in the "boom or bust" days of the 1920s and 1930s. No thing like the 1929 and '33 depression, it is expected during the next decade. What is more likely is that we will have business fluctuations of moderate size and relatively short duration. In other words, national income may drop 10% over a period of two years. But it is not likely to drop 25% and then stay for five years.

Quite a number of groups have been just under the economy in recent years, to prevent the net of collapse that occurred in 1929-33. There is insurance for bank deposits, support for farm prices, unemployment insurance, federal loans to distressed business firms, minimum wage for employment in certain part a few. But there also have been some basic changes in the economy itself that indicate greater stability in the future.

(1) **BUSINESS PLANNING** has improved. Better man-

agement and increasing techniques are helping companies to smooth out inventory fluctuations. New construction does not go up and down as sharply as it used to because more companies are planning their capital expenditures on a long-range basis. And financial policy is more conservative. Firms now go deeply into debt.

(2) **THE CONSUMER MARKET** is much broader, and much more stable, than it was 20 or even 10 years ago, because we have had a vast substitution of income. There are proportionately fewer people in the top and bottom income brackets than there used to be. And there are many more "middle-class" people, with relatively high incomes to spend. This means a much steadier market for all sorts of goods that families buy once they get above the subsistence level. It also means many more families can pay savings while for a rainy day. And it means a large group of them are in the market for houses, as well as automobiles.

(3) **THE GOVERNMENT** now is committed to fight any business recession with every means at its disposal. And it has the means—tax cuts, public works, counter regulations on lending, and the purchasing power of federal agencies that buy everything from farm products to military equipment. Government action still is cumbersome. And because it starts slowly, it can always be effective immediately. But now under way, legislative federal spending can turn the business tide.

EFFECTS ON AIR TRAVEL

Still there are going to be ups and downs. And they may affect air travel more than was the case in 1933, or 1938. Air travel, like most other "luxury" industries, has been dipping into the middle-class market. This is particularly true of aircraft travel. It is going to be an increasing factor as the airlines carry a higher proportion of pleasure travel, as opposed to business traffic. The very fact that this market has been broadened makes it more vulnerable to slight dips.

On a dip of 5% to 10% in national income, many middle-class families probably will cut out sharply for a year or so in the extra items in their budget—purchases of durable goods, expensive food and clothes—and travel. Not spending will cut back. And they will not have to stop spending altogether, because (for the reason given above) cycles are not as severe as they used to be. Since incomes are not likely to hit low, travel expenditures will assume their growth trend before long.

But in that "all good" or two, the growth in airline business can slow down. The trend in air traffic, over the long pull, will continue up more strongly than general business. And whatever around the trend line will be less. But that does not mean general business fluctuations, and enough effects from them, to keep the air transport industry very interested in business forecasting.

Editorial illustrations Oct. 13 and 19, Nov. 22, Dec. 7 and 21.



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SHORTLINES

► **American Airlines** has submitted a plan to the FAA and a bid to the San Francisco Airport land owned by the city's utilities commission is a minor setback.

► **British Overseas Airways Corp.** will operate Viking services to its weekly service between Miami and Jamaica, British West Indies, beginning Jan. 16. . . . **BOAC** announced the 100th anniversary of powered flight by making a reconnaissance of Atlantic airway flight in a Conquest I from London to southwest Ireland.

► **Capital Airlines** notified its annual pay contract with Air Line Pilots Assn. before the Jan. 1 expiration date for the first time in postwar Capital-ALPA negotiations. Major increases in some wages and benefits were granted.

► **Emery Air Freight Corp.** has expanded its automatic freight forwarding to include Canada and Alaska.

► **Flying Tiger Line** has been a contingent of 490 Chinese Nationalist military troops from Lushan's Field, San Diego, Calif., to Norfolk, Va., for training by the U. S. Navy prior to being sent to New Guinea to fight for the Republic of China.

► **KLM, Royal Dutch Airlines**, has its annual agreement with New York Airways for helicopter passenger service between Manhattan, La Guardia and New York airports, the first trans-Atlantic carrier to take this step. . . . Corried 17% more passengers in the first six months of last year than the first three quarters of 1950. Third quarter shows an increase of 25% over the same period last year. KLM has started twice-weekly service from New York to Tokyo with Super Constellation.

► **Northeast Orient Airlines** set up 50 extra service flights to accommodate an record number of holiday travelers.

► **Pan American World Airways** (press release), Hovey J. Friendly, claims foreign flag airlines have "published" only three-quarters of the business between northwestern U. S. and top Caribbean vacation resorts as a result of the government's delay in permitting American carriers to provide through service to that area.

► **Philippine Air Lines** has removed passengers to operate weekly service between Hong Kong and Bangkok, connecting with PAL. Douglas services at Bangkok. . . . PAL also has been granted "fifth freedom" rights between

Air Cargo Lead

Pan American World Airways recently scheduled U. S. flag lanes will dominate the trans-Atlantic air cargo market this year.

PAA will increase its own airfreight capacity by 55% to provide space for a total of 100 million lb. of cargo as compared to Europe, Central and South America and the Pacific East.

On trans-Atlantic routes, Pan American expects these developments to boost freight items by U. S. carriers, most the present average of some 50% of the market.

► **Delivery to PAA** of three all-cargo DC-6As, allowing at least 500,000 U. S. freight rights and three 747 bombers require space.

► **Rate reduction** of 10% for general commodity shipments at least 400 lb.

AVIATION CALENDAR

Jan. 31—Florida Air Pilot Assn., 11th or end or end, Miami, Fla.

Feb. 1—1951-1952 of Georgia Technological trade show and convention, Midway Square, Georgia, New York.

Feb. 1—1951-1952 of American Engineers, annual meeting, Sheraton-Capitol, and Hotel Statler, Detroit. American Aerospace Society will present a luncheon and reception and a presentation on rocket launch problems Jan. 31.

Feb. 16—American Institute of Electrical Engineers, winter general meeting, Hotel Statler, New York.

Feb. 20—Dependent Research on Production and Services, Control One Institute of Technology, Cleveland. Special exhibit: Ford 5000 of Lockheed Aircraft.

Feb. 21—Plant Maintenance & Engineering, International Association, Cleveland. Conference will be held concurrently at the Hotel Grand Hilton.

Feb. 21—Institute of the Automotive Society, 2nd annual meeting, Hotel Statler, New York. Member Study Dinner.

Feb. 21—American Helicopter Society will present papers on transport and military rotary aircraft Feb. 21.

Feb. 13—American Society for Testing Materials 1951 Convention Week with symposium on role of transport and design of experimental. Sheraton Hotel, Washington.

Feb. 13-15—Society of Public Engineers, with annual dinner conference on modernization. Fairmont Hotel Chicago.

Feb. 4—International Society of Aeronautics, 19th annual annual conference, Hotel Statler, New York. Aeronautics section papers will include: "Modernization of the Transportation in Flight."

Feb. 4-6—Institute of Radio Engineers, with Radioelectronics Conference and Electronics Show, Hotel Statler, New York.

Feb. 10-11—Institute of Radio Engineers, annual conference, Waldorf-Astoria Hotel and Sheraton Hotel, New York.

Apr. 14-15—American Management Assn., 2nd National Production Symposium, Copley Place Hotel, New York.

Apr. 14-15—Society for Experimental Science, spring meeting, Netherlands Plant Hotel, Groningen.

Apr. 15-16—Symposium on automatic production of electronic components, sponsored by the American Research in Design and ORP, Fairmont Hotel, San Francisco.

Apr. 21-24—Second annual shaded perspective for modernization and growth, sponsored by the Texas section of IAS, Midway Hotel, Dallas.

Apr. 21-24—American Institute of Electrical Engineers, conference on industrial control, Statler Hotel, New York.

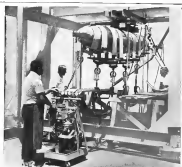
May 4-6—1951 Fairmount, Commonwealth Symposium, Department of Interior, National Washington D. C.

May 5-7—Third International Airlines Trade Show, sponsored by Aircraft Trade Shows Inc., 710 Regency Avenue, New York.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—JANUARY 4, 1951

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Municipal Airports Vs. Property Values

Six factual studies in six major metropolitan areas of the United States leave no doubt that, generally speaking, municipal airports do not affect adversely the value of real estate in the vicinity.

This is the conclusion of Herman O. Wildner, Chicago realtor and appraiser, who has just completed the most comprehensive survey on this controversial subject that has come to our attention.

Mr. Wildner took notice of increasing reports and printed publications in recent years that airports were depressing values of residential real estate. This opinion was accepted by some leaders of mortgage money, and a few federal agencies resisted witnesses and guarantees of home loans in certain areas adjacent to airports, Mr. Wildner said.

"In recent years the indictment became stronger and more vocal, but nowhere was there any factual evidence that the airport did actually depress the value of residential real estate. As a matter of fact there was ample evidence of an increase because if the airport did have such a depressing influence, how could the construction of so many residences be encroaching on the immediate adjacent vacant land?"

Mr. Wildner's survey revealed. It included Chicago Midway Airport; Los Angeles International and Long Beach Air Terminal; Denver's Stapleton Field; Dallas Love Field; Newark, N. J., Airport and La Guardia in Queens, N. Y.

His report is titled, "The Impact of Municipal Airports on the Market Value of Real Estate in the Adjacent Area."

His major findings, of considerable importance to aviation, were these:

Over 800 double transactions revealed that the market behavior is about the same in report areas as in areas not in the airport environment.

More than 30,000 buildings (mostly all houses) have been built within a mile of six airports in a 12-year period from 1948.

The number of properties for sale in the airport areas was in most cases less and in a few very slightly more than in comparable areas.

There appeared to be no appreciable difference in market behavior in areas in the path of flight from the other areas.

That airport areas which included houses were in good condition with better than average maintenance.

That trade opinion of all estate brokers active in the areas showed without exception that airports had not influenced the value of homes adversely. Trade opinion of appraisers and mortgage lenders was divided. Some thought that the noise, interference with television and aviation, produced such outbalance others did not.

If the noise, interference and security did have any effect on the market behavior, it was offset by incentives which resulted from airports, Mr. Wildner found. Some of these incentives may be:

1—Better transportation to account of the airport

2—Thousands of new employees at the airport strengthens the demand for housing.

3—in many places new industry built near the airport brings more job opportunities.

"In all the communities an effort was made to get trade opinion on the effect of airport activity," Mr. Wildner reported. "In every case real estate brokers who had operated in the neighborhoods adjacent to the airports and that the activities of the airport did not affect their business adversely and that they confirmed the findings of our research."

Mr. Wildner decided that Chicago Midway was an excellent subject for the beginning of such a study because it holds the claim of the busiest airport in the world, with more than 300 movements a day and more than 5 million passengers a year, employing nearly 7,000 persons. It is comparatively small with one square mile. This means that most of the six runways are less than a mile long. Then, planes "must" contact the runways as soon as possible after reaching the field and thus in turn means either that the descent is precipitous or the plane flies lower over adjacent territory. Residential buildings are very close to the ends of the runways in several areas houses are within 300 to 400 ft. and in one case are only more than a quarter of a mile away.

It seemed obvious that if airports had an adverse effect on the value of adjoining real estate, it would tend to show up conspicuously in a study of the area around Chicago Midway. No such effect materialized.

The number of properties for sale in the Midway Airport section was "conspicuously low," Mr. Wildner found. "It appeared therefore that imposed residential property in the airport area was not for sale in any great quantity and, demand was strong."

It was decided that the amount of new construction in the immediate area was also an indication of the effect of an airport on its community. Mr. Wildner discovered that out of about 6,500 houses within a mile of the airport, about two-thirds of them (or 4,300) had been built since 1940, and most of that was after World War II. There were "conspicuous indications that many more buildings would be built in the immediate future."

"Thus" upon the nature of the market behavior in the area surrounding Chicago Midway Airport as compared to other areas outside of the airport environment, one can come to no other conclusion than that the airport did not affect the value of buildings and estate adversely," Mr. Wildner decided.

Hundreds of houses adjoin Midway Airport, but Mr. Wildner noted that the closest houses to Newark Airport, subject of so many accusations in recent years as a nuisance and hazard to citizens on the ground, are at least a mile and a half away. The Newark study dealt with these closest houses in Elizabeth and Newark, as compared with homes in other communities for reference—Fort Orange and Elizabeth.

"All data pointed to the fact that Newark Airport had no noticeable influence on adjoining real estate," the Chicago appraiser asserted.

Facts—not fiction—indicated the more lack of depressing effect at other airports studied.—Robert H. Wood

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